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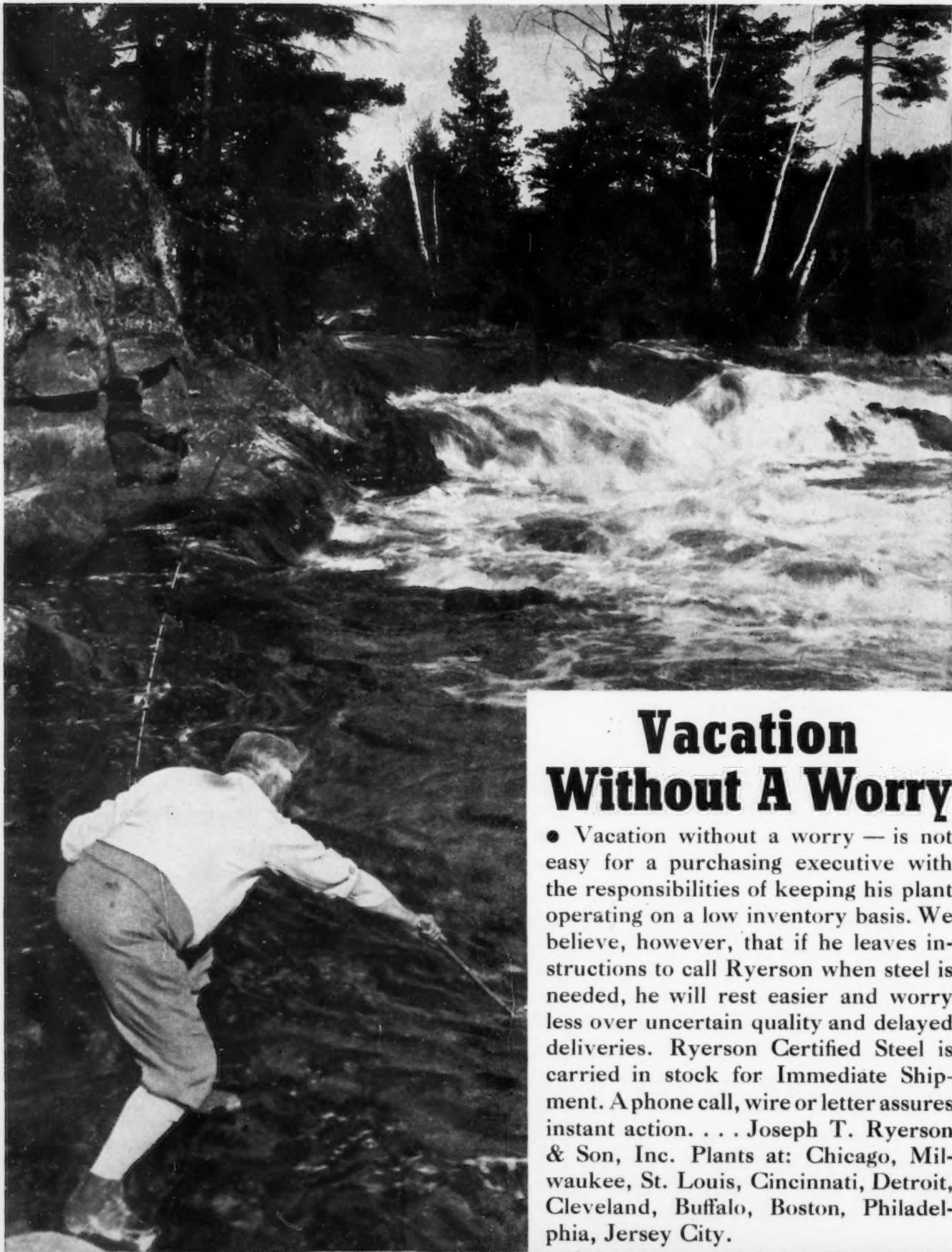
THE IRON AGE

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JULY 7, 1938

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... THE IRON AGE ...

JULY 7, 1938

ESTABLISHED 1855

Vol. 142, No. 1

Charlie Hasn't Got It

THIS talk about heartless executives who are paid a \$1,000 a day has aroused our curiosity. We haven't been able to locate any of them in our field of endeavor.

Of course, there are other fields that we have not investigated. Insurance, for instance, or motion pictures. Or radio.

Now, we have it! The person mentioned but not named must have been Charley McCarthy. He fits the description.

Charley takes down \$10,000 per week for his radio performance, so it is said. Deducting for his dependent, Bergen, and for the glue, paint and stuffing necessary for his upkeep and repair, that should net Charley \$1,000 per day. He fits the bill in that particular.

Charley has no heart. And Charley is an executive. He sits around, does all of the talking and lets somebody else do all of the work. It must be Charley.

We wrote to Charley about it and he told us that the situation was not quite as reported. There had been no mention of the "kick back." Charley admitted that he earns \$1,000 per day but said that all he got out of it to spend was 50 cents a week. Charley kicks back the rest of it to Bergen, and Bergen kicks back most of the balance to Government in taxes.

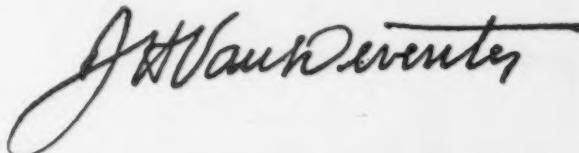
We mustn't forget the "kick back."

A thousand dollars a day is \$365,000 per year, counting Sundays and holidays. Of that amount, Uncle Sam takes a "kick back" of \$200,000 in federal income tax. State and local governments would take at least \$50,000 more. So the thousand dollars a day becomes about \$300 per day through taxation "ledger domain," which is the political synonym for "sleight of hand," or "now you see it, now you don't."

The \$250,000 which is kicked back in taxes eventually finds its way into wages. Government employees, WPA workers and in some part wage earners in private industry are supported by it. At an average of say \$1,500 per year, this would mean that the kick back pays annual wages to 166 workers, non-productive and otherwise.

So Charley might say: "Me getting paid \$1,000 a day? Nix on that stuff. It's me and Bergen and 166 other fellows."

In other words, Charley may get it, but Charley hasn't got it.



Nine Plants Cut Handling

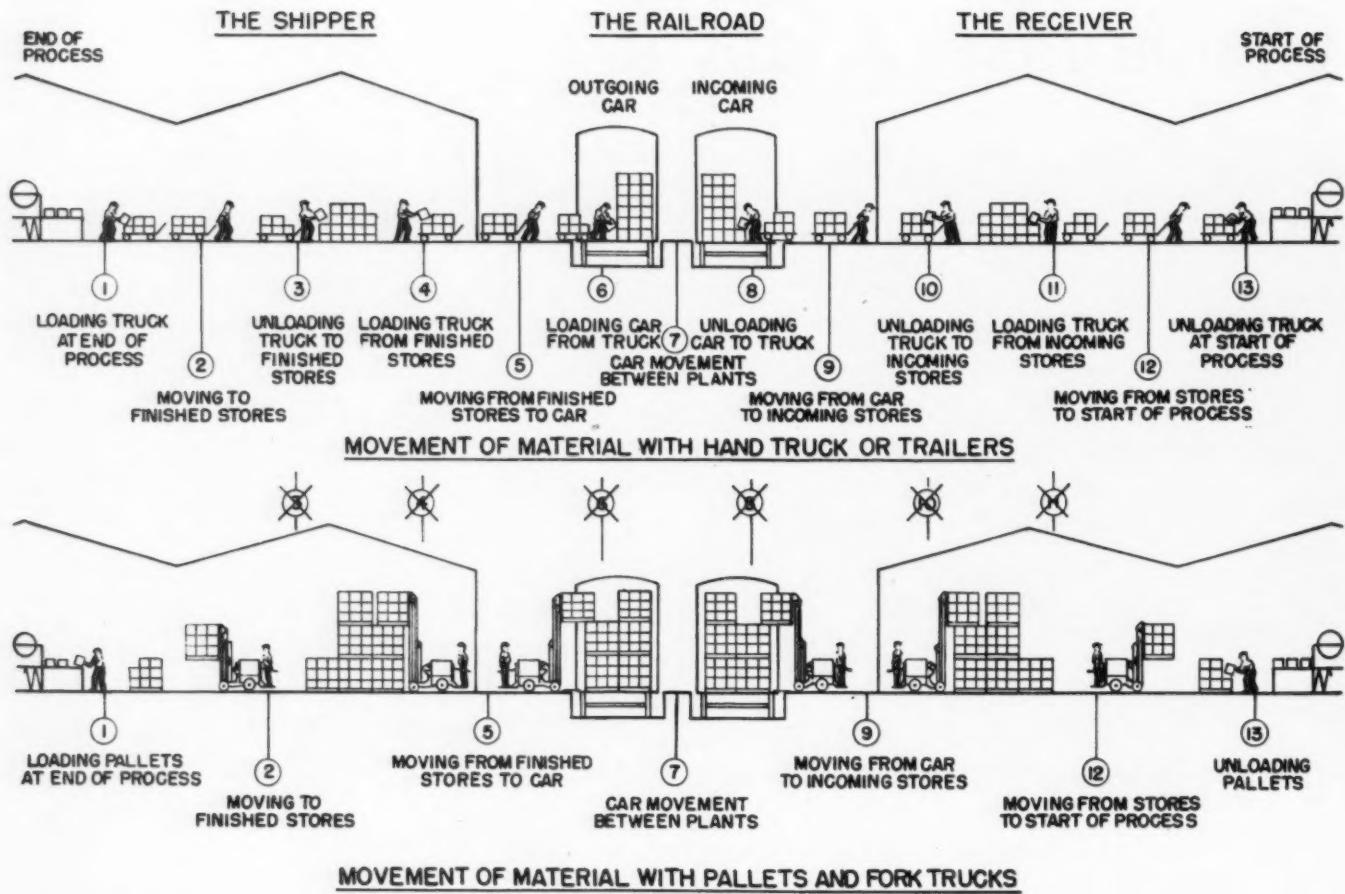


FIG. 1—Diagram of handling movements, comparing hand truck or trailer methods with pallets and fork trucks.

(Editor's note: The above article by Mr. Beattie is a general introduction to a series of specific stories on the newer materials handling methods in various General Electric plants, which are to be published in The Iron Age.)

○ ○ ○

IT is only within recent years that management in general has begun to realize the opportunities for effecting cost reductions through the

scientific study of the movement of materials into, through, and out of the industrial plant. So much attention has been centered on the modernization of machine and process operations that the equally important factor of getting materials to and away from those operations on schedules which will permit of maximum operation opportunities has in many instances been neglected. Today, however, attention is being focused sharply on the fact that it is just as important to give as much consideration to stocking parts and materials in such a way as to make them available quickly and easily when they are

needed, and to the rapid handling of those parts and materials when work is to be done on them, as it is to plan minutely for the more obvious factors in production.

Loading, unloading, shipping, transportation from department to department within the plant, factory processing and machining—all involve the expense of moving. No industrial executive can afford to forget this fact for a moment. So apparent has it been in the various plants of the General Electric Co. that internal transportation has long been considered a major division of operations from the management viewpoint.

Costs 50% in 1937

Over one million tons of material are received each year at the nine apparatus works of the General Electric Co. Adequate provision

representative from each works, was appointed to study and to coordinate the handling of materials throughout the entire company. The objectives of

By H. J. BEATTIE
*Manufacturing General Committee,
General Electric Co.*

this committee were, of course, the determination of improved methods of storing and handling of goods, and the selection of equipment which would enable the changes in methods indicated to effect maximum economies.

Following the accumulation of a great deal of data regarding the characteristics of the materials handled in the various plants (shapes, sizes, weights, etc.), and of storage facilities as well as of the volume of movements from point to point within the plants, it became apparent that the simplest way to effect improvements was to study the possible application of the newer types of mechanical handling equipment now on the market, in relation to the actual handling problems in the plants. As a matter



FIG. 2—Before and after methods of storing lightning arrestors and cutouts. (Above) A—by hand; (at right) B—by fork truck.

must consequently be maintained for economically handling every kind, size and shape of materials in these shipments. And, since the handling of the tremendous variety of goods must be done not once but many times between the time of its entrance into any plant as raw material and the time of its exit as finished product, the manifold problems involved have been recognized as worthy of the most careful analysis at the hands of competent and experienced materials handling experts.

Special Committee Appointed

Late in 1936 a special Materials Handling Committee, consisting of a

of fact, in the analysis of any materials handling problem today it may safely be assumed that the key may be found in a consideration of improved mechanical handling equipment.

Of the three types of mechanical handling equipment then in use in the various plants of the company—cranes and hoists, conveyors, and mobile trucks—mobile trucks have actually proved to be the most logical way of avoiding the majority of needless materials handling expenses. And, in particular, the committee found that the pallet-fork truck method of handling was a very flexible, adaptable method which offered great promise of cost savings.

A Program Established

Early in 1937 a program of modernization of industrial truck equipment was begun, and by the end of that year, 50 electric fork trucks, to-

gether with the necessary auxiliary equipment, had been purchased for use in the nine apparatus works of the Company. The use of these modern trucks is now thoroughly established with General Electric. Their use, combined with the pallet method of packing in unit loads, has been the direct cause of handling-cost reductions amounting to 50 per cent during the year 1937 alone.

The major differences between the older methods of moving materials by hand trucks or trailers, and the newer pallet-fork truck methods of handling are shown graphically in the diagram of Fig. 1. In a normal cycle of operations, the former 13 separate handling movements are reduced to seven, and much larger volumes of materials may be moved in each of the seven operations of the newer method. The fork truck method is at its best when moving materials in unit loads (sometimes called "inner containers") without breaking bulk. This means a sav-

ing of both time and floor space; and it means further that materials can be stored more neatly and safely. This is well illustrated in photographs A and B of Fig. 2. Similarly the remarkable improvement in the fork truck method of handling transformer bases is shown by photographs A and B of Fig. 3.

Naturally there are other considerations than the mere purchase of correct equipment and the utilization of unit loads with pallets, entering into the problems of economical handling. Places of storage, and the courses of material-flow through the plant must be carefully planned. Every rehandling operation adds to the cost of the final product without improving its quality, and therefore every rehandling step that can be eliminated without sacrificing floor space helps to reduce production cost. Piling, repiling, handling and rehandling are the chief causes of waste in any operation of moving goods.

Two Methods of Handling

Moving in small packages (Fig. 2, A) means breaking bulk, and for that reason means added expense. On the other hand, modern practice is to move materials in unit loads (Fig. 2, B). The first method has a direct handling cost of at least 25 cents per ton each time the goods are picked up and laid down. The second method shows a cost of not over eight cents per ton handled, on the average.



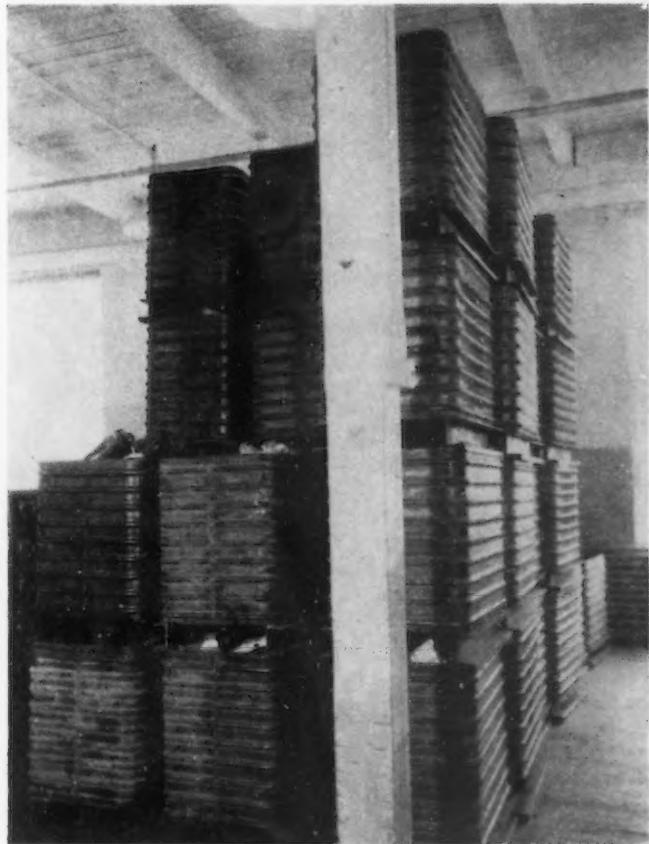
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AT LEFT

FIG. 3—Before and after methods of handling transformer tank bases. (At left) A—by hand; (below) B—by fork truck.



Practically all classes of materials received in our plants can be loaded on pallets in unit loads at the points where manufacturing or processing operations are completed. The unit load can be kept intact and the material protected against damage throughout all subsequent moves, including inter-plant transportation, warehousing, car-loading, car-unloading, stocking, and transportation up to the point where the material is to be used or redistributed.



AT RIGHT
FIG. 5—Drums of glyptal resin solutions stored four high with elevating fork truck.

AT LEFT
FIG. 4—"Live" (caster-mounted) pressed steel tote boxes tiered four high with fork trucks.

material in equal units per package in convenient form for checking weight, together with systematic stacking of parts on pallets to permit ready accessibility for counting purposes, contributed their share to the 25 per cent reduction in the cost of the annual inventory count in 1937 as compared with the cost in 1936. Again this point is made clear by reference to photographs A and B of Fig. 2.

6—Stocking materials on pallets with the aid of tiering forks has the advantage of being extremely inexpensive, and further, packages can be piled higher and straighter, with a consequent saving in floor space. This saving in floor space in storage areas ranges from 25 per cent to 75 per cent, and averages about 50 per cent. Typical examples of such savings are: Coils of welding wire... 37,000 sq. ft. Warehousing wire and

cable 10,000 sq. ft. Storing porcelains 5,000 sq. ft. Storing drum material... 5,000 sq. ft.

Variety of Applications

There are many kinds of materials that lend themselves readily to fork

Close observation of the operation of fork trucks handling pallet loads in our own plants has shown that the advantages of the new methods from a cost-reduction standpoint are:

1—There is less damage to the materials.

2—In some cases it is possible to eliminate the packing and packaging steps. As a consequence these eliminations effect reductions in the overall handling cost. As examples, these facts may be cited:

a—Stainless steel strips were formerly received in heavy wooden boxes. By substituting corrugated paper and steel band strapping on skids, the cost of packing was reduced 50 per cent.

b—Washing machine gear cases are now received from the vendors in racks, while activators and motors are received on pallets; eliminating entirely the cost of cartons. Each carton formerly cost two cents per item.

3—Unit loads can be stowed safely in cars without bulkheads or similar devices. The cost of storage, including bracing, is thus greatly reduced.

4—Unloading costs are kept to a minimum.

5—Further savings may be found in the use of pallet loads as a storage and inventory unit, thus reducing the costs of sorting, checking, inspecting, accounting and taking inventories. As an example, efforts toward handling



AT LEFT

FIG. 6—Transformer suspension hooks stacked in pallet container and handled by fork truck and on trailer.



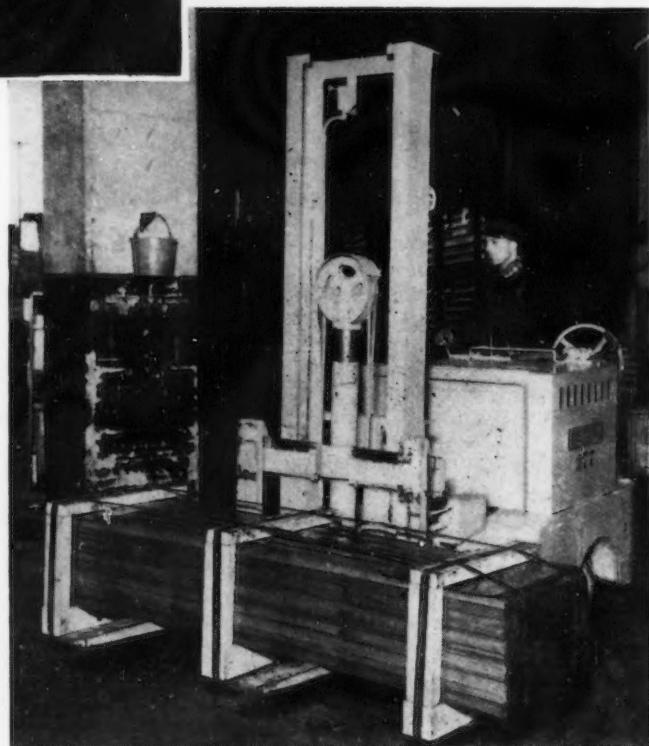
ABOVE

FIG. 7—5,000 lb. unit load of steel disks handled by fork truck directly out of box car.

• • •

AT RIGHT

FIG. 8—Bundle of strip steel being handled by a fork truck.



truck handling. When, in addition, scientific packaging is also incorporated in the general materials handling plan, the advantages of fork truck handling can be exploited to the utmost. Several illustrations reproduced herewith show this clearly. Note especially Fig. 4, live pressed steel tote boxes tiered high at the Bridgeport Works; Fig. 5, drums of glyptal resin solutions formerly stored one high are now stored four high by elevating fork trucks at the Schenectady Works; and Fig. 6, distribution - transformer suspension hooks carried in pallet containers at the Pittsfield Works.

Many different forms or attachments can be built on pallets, including corner posts supporting shelving crates, or box sides, or vertical racks; or special shapes of packages can be

strapped directly to the pallet. These attachments can be designed to carry specific commodities in units of standard size from one manufacturing operation to another. Further, the pallet loads can be used on longer hauls, as on highway trucks and trailers, or in railroad cars. Fig. 7 shows a fork truck handling a unit load of steel disks weighing 5,000 lbs., strapped in place on a pallet, at a box car for receiving into storage in the refrigerator department of the Schenectady Works. Fig. 8 shows the method of handling strip steel in pallet-bundles in the same department.

Again, special live tote boxes and racks with caster wheels for hand movement between machines may be readily designed for fork truck shifting and tiering, while in certain cases hand lift trucks for moving loads on double-faced pallets, as in Fig. 9, may be found desirable for short distance movements.

Good housekeeping is one of the outstanding results of the pallet-fork truck method of tiering materials. This feature is illustrated by such photographs as 2 B and 3 B.

A Typical Application

The manufacture of home laundry equipment, washing machines and ironers was moved to a new location in our Bridgeport Works last year, affording an excellent opportunity to put into practice the results of the committee's studies. In planning this department equal consideration was given to the factors of facilities for stocking parts and materials, materials handling through the conversion processes, and machine and equipment layout. All bulky items such as crates, tubs and motors, were studied in detail to determine the handling classification, location, space required and the equipment required for the most economical handling.

The fork truck method of handling was adopted, and the machines were laid out for fork truck service. Auxiliary equipment such as live racks,

FIG. 9—Double-faced pallet type of unit load being transferred over short distances by hand-operated lift truck.



tote boxes, and pallets were designed on the basis of fork truck handling.

A schematic layout of this department as now constituted is shown in Fig. 10. Incoming materials are unloaded from trucks at a platform at one end of the building, near the end of the assembly line, conveniently located for both carload and truck shipments. The movement of materials in this department is entirely by fork truck and assembly conveyors. The annual savings as compared with former methods of handling, amount to approximately 40 per cent in this department.

and the crates at the end of the assembly line. The warehousing of the finished equipment is located at the far end of the building, near the end of the assembly line, conveniently located for both carload and truck shipments. The movement of materials in this department is entirely by fork truck and assembly conveyors. The annual savings as compared with former methods of handling, amount to approximately 40 per cent in this department.

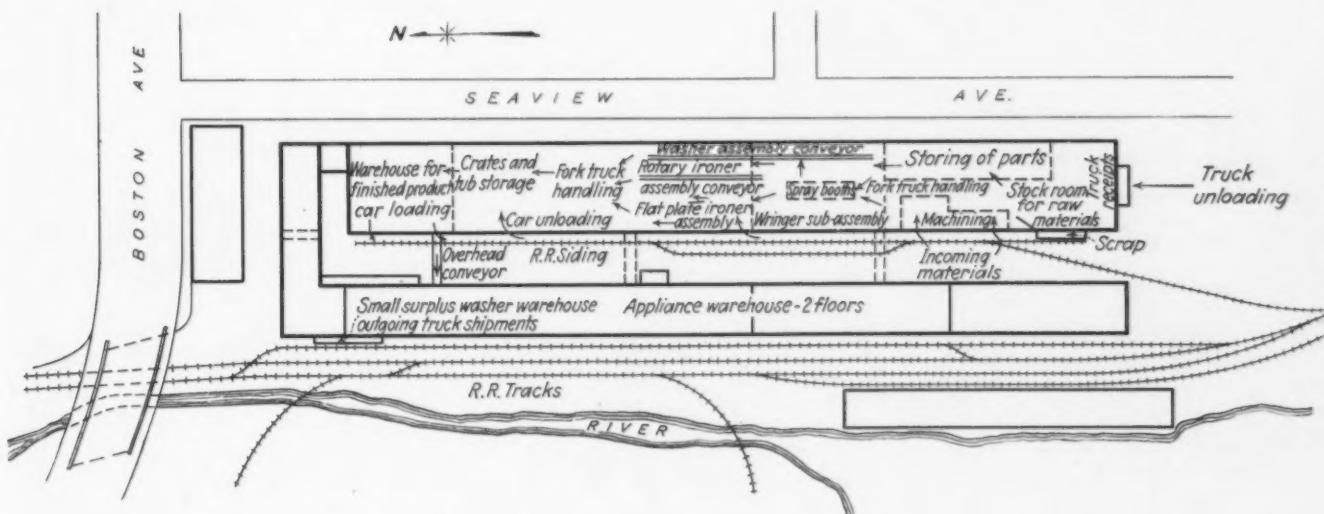


FIG. 10—Schematic layout of department at Bridgeport Works laid out for fork truck and assembly conveyor handling.

Structural Welding Progress in

Up to the end of 1936 nearly 300 all-welded bridges were put in service in Germany, about half of them for the railroads, the other half for the Reichsautobahnen (State Motor Roads) which are also under the management of the German State Railways.

As regards their size and span, bridges in Germany are exceeded by those in other countries, especially, of course, by the world's largest bridges in the United States of America. This is only natural, as rivers in Germany have not presented nor ever will present the need for designing bridges of more than their own width. There is no doubt, however, of the vast developments made in German bridge construction since 1930¹, when the first small welded railroad bridge was put into service. This 33-ft. span bridge

¹ O. Bondy, *The Iron Age*, April 2, 1931.

² G. Schaper, Second Congress, International Association for Bridge and Structural Engineering, Berlin, 1936.

By DIPLO.-ING. O. BONDY
Consulting Engineer, London, England

was by no means the first all-welded bridge; several years before a number of both railroad and highway bridges had been welded in America, and on the European continent in 1929 a 30-ft. railroad bridge had been put into service in Austria near Graz.

Welding in the construction of bridges is, therefore, only of very recent date compared with its application in other branches of structural engineering. But within a few years it has become an almost every-day occurrence in Germany and in other countries. Although many welded bridges of very large dimensions were erected in the United States, some notes on structural details of welded bridges in Germany may be of interest especially as the designing

methods and welding practice differ widely in these countries.

Welded Railroad Bridges Are of Plate Girder Type

For welded railroad bridges in Germany the plate girder type only has been accepted so far². For highway bridges, however, the rigid arch type was also accepted, as described later on. While riveted truss bridges of many different types have been erected in recent years, no truss bridge in welded construction has been put into service in Germany. These facts are based on the results of extensive fatigue research carried out between 1930 and 1936. Every detail of welded construction was determined with regard to fatigue. At the same time new sections were introduced to increase the fatigue strength of plate girders and to facilitate welding.

Of the various types of rolled flanges for welded plate girders the

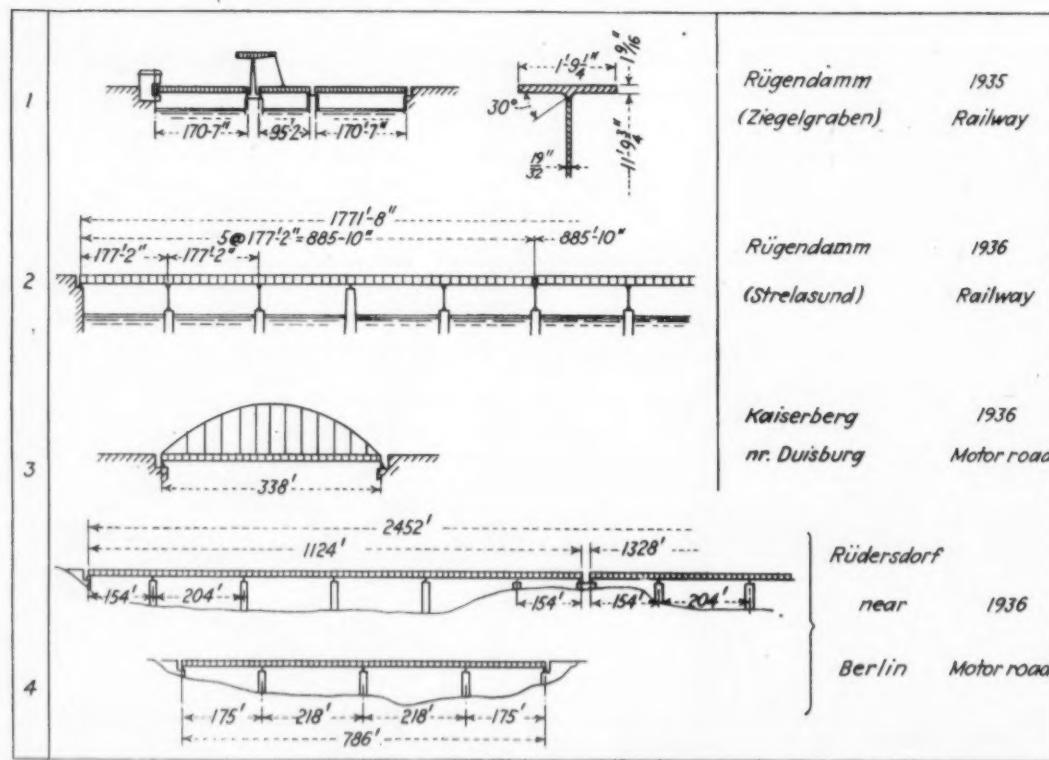


TABLE I—Main Dimensions of Some of the Largest Welded Bridges in Germany.

Germany

PART III—Railroad and Highway Bridges

so-called Wulstprofil had an output of about 16,000 tons up to the beginning of 1936. These flanges of rectangular section are rolled with a triangular rib in the center-line as shown in Fig. 1. They are available in thicknesses up to $3\frac{1}{2}$ in. and in widths up to $39\frac{3}{8}$ in. These triangular rib sections are at present the most popular type for the construction of long span bridges by welding. They embody the principle which emerges from all fatigue tests, however different their individual results, namely: concentration of stress must be avoided, and transitions from one structural component to another must therefore be rounded as thoroughly as possible³. This principle is well fulfilled by this type of flange plate and its welded connection to the web.

The new regulations for welded plate girder railroad bridges as published by the German State Railways in 1936 contain many rules concern-

SINCE 1930, more than 300 all-welded bridges have been put into service in Germany. Interesting data on the design and welding procedure of some of the outstanding of these structures are given in this article, which concludes the series by Mr. Bondy. The first article, on "Research and Design," appeared in The Iron Age of June 2, and the second, on "Rigid Frame Buildings," in the issue of June 23.

influence on the flange itself and practically no distortion at the edges of the flange has been experienced. Regarding the joint in the web a very wide angle was used for the double-V weld so as to secure sound penetration in the root and a smooth transition from the weld to the plate. By using different sections of stiffeners and thus staggering the welds on the web the coincidence of four fillet welds within a narrow zone is avoided.

Important Advances In Practice

To give an idea of welded bridge construction in Germany, some of the largest bridges are shown in Table 1 by their main dimensions. All of these bridges are of quite recent date. On the 5th of October, 1936, the connection between the mainland and the isle of Rügen was officially opened, consisting of two separate lines of bridges for road traffic and railway. The railroad bridges are welded as indicated

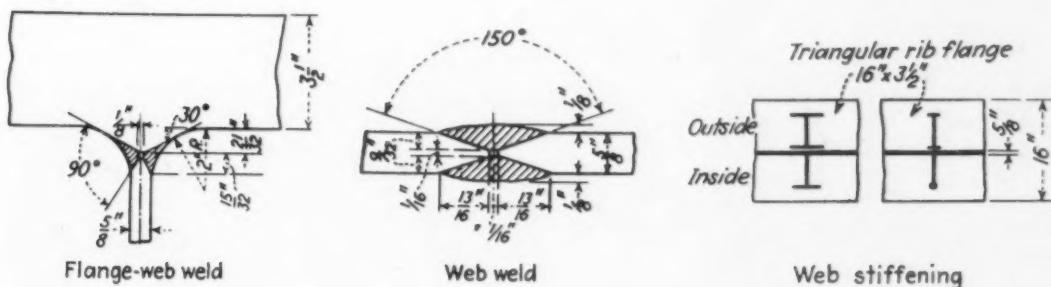


FIG. 1—Details of a 108-ft. span all-welded railroad bridge at Stettin.

ing the design based on the rather complicated diagrams of permissible stresses, and also the welding procedure itself. They give recommendations for the sequence of work to be adopted in shop and on site to reduce shrinkage stresses and distortion to a minimum. Use of jigs, mainly of the rotary type, is strongly recommended and strict regulations are laid down regarding the supervision of work and testing of the finished job by X-rays and other means. Some of these points

web and the flange plates, the latter being delivered by the rolling mills in one length of 108 ft. The rolling as well as the transport of these triangular rib flange plates is a noteworthy achievement. These flange plates being delivered to the structural firm are shown in Fig. 2.

The main purpose of the triangular rib flange may be judged from Fig. 1. The amount of welding between flange and web is reduced to a minimum and not greater than necessary for transmitting the shear stress. Again, any shrinkage in the weld will be without

in the Table, items 1 and 2. In every respect, from raw materials to finished structure, they represent important advances in practice.

The welded plate girders of the *Ziegelgraben* bridge are built up from webs and triangular rib plate flanges as indicated in the sketch. For the main spans these flange plates are nearly 174 ft. in length, rolled in one piece so as to eliminate any welding in the flanges. At the bridge works, flanges and web plate were assembled in circular clamps which were then turned on rollers as required to bring

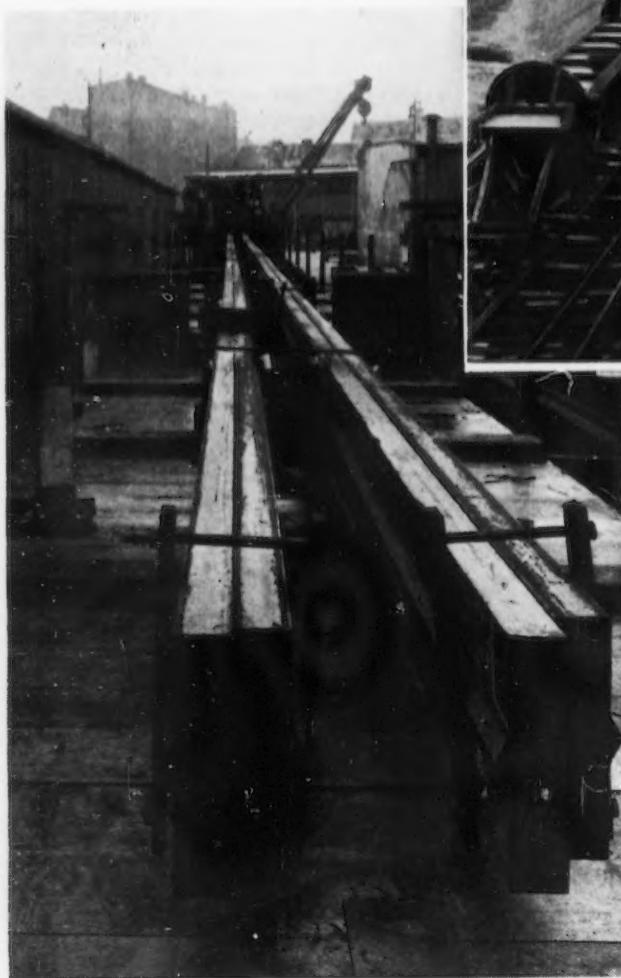
³ O. Bondy, Paper at the welding symposium of the Iron and Steel Institute, London, 1935.

the welds successively into the most convenient position. The finished main girders, each 170 ft. in length and weighing about 42 tons each, were carried singly to Stralsund by rail over 375 miles distance, then transferred from rail to ship, then floated to the site and placed on their respective supports. Here, too, the small thickness of the web of the plate girders is a noticeable feature. Actually the web is dimensioned strictly in accordance with the stress calculations and the fact that this is possible in welded girders often results in substantial saving where the necessary

of the butt weld, the maximum diameter being a No. 4 gage electrode for the subsequent runs.

Still larger dimensions were ob-

est all-welded railroad bridge so far, and perhaps the single span of 177 ft. 2 in. may also be a record for a welded main line railroad bridge.



ABOVE
FIG. 3—General view of the Kaiserbergbrücke near Duisburg. Total span, 338 ft. A similar span is in course of erection on the left; plate girders being welded in rotary jigs.

• • •

AT LEFT
FIG. 2—Rib flange plates 16 in. x 3½ in. in section, 108-ft. long, arriving from the rolling mills. (Gollnow & Sohn, Stettin).

web thickness is smaller than available in rolled sections.

Bare Wire Welding Used

It is interesting that for this most important work mainly bare wire welding was used. Only a few of the highly stressed joints were welded by heavily-coated electrodes, for instance the web welds. No. 11 gage electrodes were used for the first run at the root

tained with the *Strelasund* bridge spanning the second portion of the straits between Stralsund and the isle of Rügen. The dimensions are shown under item 2 in the Table. Plate girders are continuous over five spans each, fixed bearings being arranged on the main piers, the other supports being welded rocker frames. The total length of this bridge (1771 ft. 8 in.) appears to indicate that it is the long-

Item 3 of the Table refers to the *Kaiserberg* highway bridge near Duisburg. This bridge is of the rigid arch type, of 338 ft. span and possibly the longest span for an all-welded bridge, although it may be expected that these records will soon be broken by still bigger single spans. Fig. 3 gives a general view of the bridge during construction. There are two separate bridges, one for each roadway of the motor road so that each of the bridges will only be used by one-way traffic.

338-Ft. Span All-Welded Highway Bridge

On the left-hand side of Fig. 3 the plate girders may be seen during assembling and welding, clamped in rotary jigs and turned into a convenient position for welding. The type of bridge is the so-called Langer girder. The main arch and the horizontal plate girder consist of the German high tensile steel St 52 (with 33 tons per sq. in. minimum tensile strength) while the girders of the bridge deck are made of structural steel St 37 with only 23.5 tons per sq. in. tensile strength. The bridge is welded throughout, both in shop and on site. The total weight of welded steel-work for the *Kaiserberg* bridges is 1100 tons, or 550 for each of the

two bridges. It is claimed to be one of the main advantages of this type of bridge that the car driver's view is not restricted by any truss members and that the vertical hanger rods offer the minimum restriction to a clear view.

A close-up view of the plate girder end during welding is shown in Fig. 4. By means of wedges the plate girder is tightly held in the rotary jig. A very rigid end joint has been designed for inserting the bottom end of the plate girder arch, and for transmitting the shear stresses to the bearings. Triangular rib flanges were used for the plate girder itself, the upper flange being slotted and reinforced by a welded-on cover plate through which the eye emerges, which is connected to the hanger by means of a bolt. Each of the two bridges was built by different firms but to similar designs.

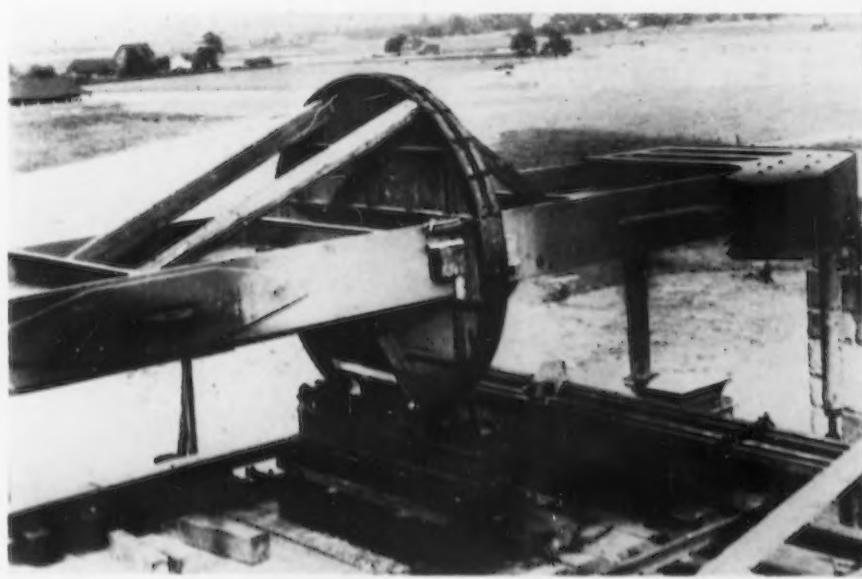
The plate girder arch type was also made use of in building another all-welded highway bridge, crossing the river Lech in Bavaria. Its span is a little shorter than that of the above-described Kaiserberg bridge but its appearance and design are very similar.

Design Influenced Also by Studies of Thermal Distortion

All these welded bridges of recent days show that the design of the welded joints and the shape of the members themselves have been deeply

sible to take contraction stresses into account in designing a welded structure by allowing them to act at such points and to such an extent that they constitute a natural initial loading re-

der item 1 in the Table, the weld between the flange and the web was built up in eight layers (four on each side) in order to assure thorough penetration and to reduce shrinkage ef-



ABOVE

FIG. 4—End portion of the plate girder for the rigid arch bridge near Duisburg, 338-ft. span, assembled in rotary jigs for welding.

• • •

BETWEEN

FIG. 5—All-welded highway bridge of 704 ft. total length crossing the State Motor Road near Berlin.



influenced by the result of careful investigations not only into the problems of fatigue but also into those of thermal distortion and internal stresses.

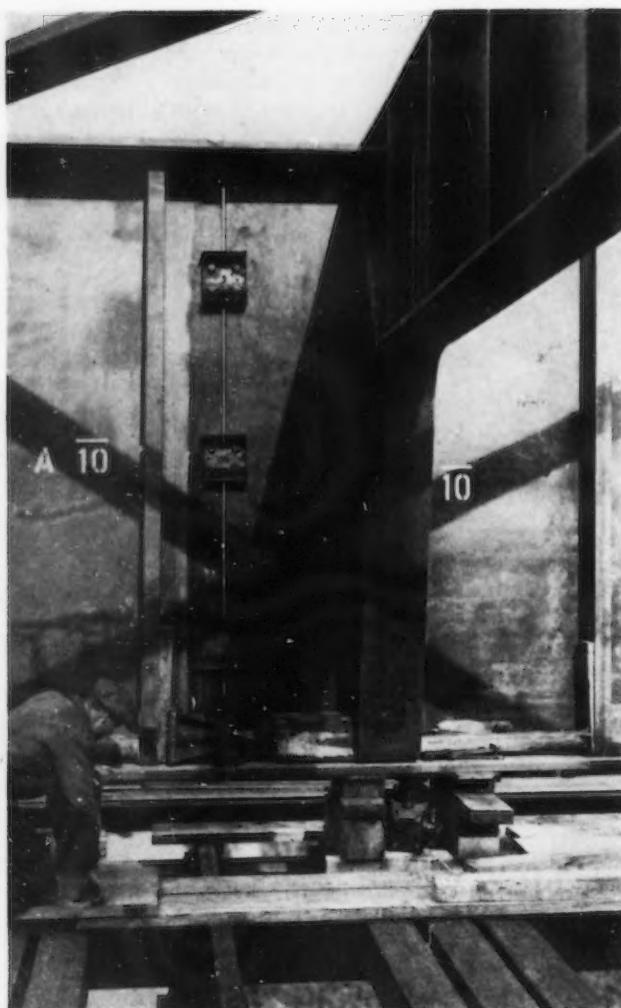
Stress measurements definitely showed that after welding of a plate girder there were tensile stresses in the upper and lower sides of the flange near the web but compression stresses near the edges of the flange. In all probability it will soon be pos-

ducing the net stresses produced by the applied load. The author published proposals some years ago for the application of this method to the case of a two-hinged frame.

Sequence of Welds Worked Out

Apart from the design itself, sequence of welds was carefully worked out for every joint. As regards the Rügendamm bridge as mentioned un-

der item 1 in the Table, the weld between the flange and the web was built up in eight layers (four on each side) in order to assure thorough penetration and to reduce shrinkage effects. From experience and the results of measurements it is evident that shrinkage stresses in plate girders welded by this method are never greater than the internal stresses in rolled beams which are usually ignored. It is, however, common knowledge confirmed by experience that considerable distortion may result from cutting a rolled beam through the center of the web. This can be



AT LEFT

FIG. 7 — Preparation for site welding the main girder 9 ft. 3 in. high of the Rüdersdorf bridge (Gollnow & Sohn, Stettin).

• • •

BELOW

FIG. 6 — A 125-ft. long portion of a main girder for the Rüdersdorf bridge being lifted from rail to ship. Its weight is 45 tons. (Gollnow & Sohn, Stettin.)

due only to internal stresses established during the rolling operation.

As regards the welding process itself the first weld was kept as small as possible to assure good penetration and minimum shrinkage. The rate of welding can be increased and costs reduced by the use of thicker electrodes and heavier currents, but the practice rightly followed in the welding of the large bridges was to use small electrodes and deposit the thick welds in a number of layers. Each layer is then annealed by heat from the next one deposited, thus relieving internal stresses. During recent years most of the welding in Germany was still done with bare wire but there is an increasing tendency to use heavily-coated electrodes at least for high quality work. The 150 deg. angle of the double-V in the butt weld much exceeds the usual value but it was chosen on the basis of the results of extensive fatigue tests on butt welds.

Inspection Important

Great importance is attached to the problems of inspection both in the

new German regulations as also in the specifications for welded highway and railway bridges published in 1936 by the American Welding Society. Mechanical tests such as tensile, bending, and impact are very useful for continuous supervision of welding in workshop and on site. Such tests, however, are necessarily applied to specimens and not to the actual joints. Non-destructive tests, on the other hand, reveal the inner structure of welds without in any way injuring the joint.

Compared with all methods of mechanical testing, X-ray examination promotes safety to an extent which can not be expressed in terms of money. Detailed specifications for X-ray tests were put into force by the German State Railways on Oct. 1, 1936⁴. Butt welds in plates up to 2 in. in thickness can be successfully tested by means of the X-ray apparatus at present available. Thicker plates, up to 3½ in., can be managed although the results shown in the X-ray films are not yet of sufficient precision. About 40 large-scale X-ray films of welds are reproduced in the above specifications to guide the supervising engineer in his decision whether a weld ought to be accepted or rejected.

X-Ray Testing Cars Used

The testing of welded railroad bridges by X-ray examination is



standard practice in Germany. The German State Railway Co. has X-ray testing cars in regular use and the Berlin-Dahlem Laboratories for Testing Materials maintain a special department for X-ray testing, at present with four or more mobile plants, and undertake work on a commercial basis at moderate prices.

It may be estimated that the cost of X-ray testing of welded bridges is in the neighborhood of 2 per cent of the value of the steel-work. Bearing in mind that such examinations can be conducted as often as necessary on bridges in service it will be appreciated that the cost bears no relation to the value of the information obtained. Much of the distrust with which the welding of large bridges is still regarded can be removed by the systematic application of X-ray examination.

Other Welded Highway Bridges

Of the great number of welded highway bridges in Germany only two more will be mentioned. Fig. 5 shows a typical continuous girder bridge crossing the two separate tracks of the State Motor Roads between Berlin and the northern coast. The main girders are continuous over five spans, two of which are 122 ft. and three of 154 ft. The total length is 552 ft. The superstructure consists of high tensile steel St 52 for the main girders while the bridge deck is made of the usual mild steel St 37. The total weight of steel is 1391 tons.

The bridges at *Rüdersdorf* near Berlin for the State Motor Roads are by far the longest all-welded bridges in Germany, not only by their total length but also by the single spans⁴. The main girders are continuous over six and seven spans respectively as shown in the Table, item 4. The maximum single span for the northern bridge is 204 ft., its total length 2452 ft. The southern bridge is only continuous over four spans but the maximum single span is still greater than that of the northern bridge, namely, 218 ft. (see item 5 of the Table). Triangular rib flange plates were again used for the main girders. They were fabricated in the shop in lengths of 125 ft. and 45 tons in weight.

⁴ Deutsche Reichsbahn, "Anweisung für Röntgenuntersuchungen," Berlin, 1936.

⁵ W. Tischer, VDI-Zeitschrift, Nr. 40, 1936.

⁶ J. H. Van Deventer, *The Iron Age*, March 25, 1937.

Fig. 6 shows one of these portions being lifted from rail to ship.

Girders 1328 Ft. Long Welded On Site

It is probably for the first time that girders of 1328 ft. length were continuously welded on site. Special arrangements were made, of course, to fit the portions exactly together and

parallel bridges. The total weight of steel is 6300 tons, of which 4850 tons are high tensile steel St 52.

The total cost was 9.4 millions of marks. Seven structural firms participated in the contract. Bridges were opened in October, 1936.

There can be little doubt about the success of structural welding in Germany since 1930. Within a period of



FIG. 8—The Rüdersdorf bridge 3300 ft. long in course of erection. In center a 45-ton portion of the main girder is being unloaded and transported to its position by rail (Gollnow & Sohn, Stettin).

hold them in position during welding. Fig. 7 shows the preparation for butt welding the web of the 9-ft. 3-in. deep main girder. The butt weld in the flanges was arranged under 45 deg. and some difficulties are always met where the flange butt weld meets the main weld between flange and web. Special procedure and sequence of work was adopted and difficulties were overcome.

A general view of the work in progress is shown in Fig. 8. One of the 125 ft. long main girder portions was just unloaded from the crane and is being transported to its position by means of an auxiliary track in the center line of the bridge. The total length is 3238 ft. for each of the two

only a few years a development took place from a 33-ft. span railroad bridge to more than 30,000 tons of all-welded bridges up to sizes as described above. The future prospects for the welding of bridges and buildings are certainly bright, although many restrictions and difficulties are still to be overcome.

"In the realm of political economy an idea must be depression-tested before it can claim to be good."⁶ A similar criterion may also be applied to technical ideas. Structural welding has already stood the test because it was born by economic depression and proved of extraordinary value to overcome it.

An Appraisal of Cold Heading

IN the third article of the series, the author discusses the two principal types of tool steel used for cold heading dies, together with their heat treatment. Tungsten carbide extrusion dies are also considered. The two previous articles appeared in the issues of June 9 and June 23. A fourth article, contributed by F. R. Palmer, of the Carpenter Steel Co., extends the general discussion of die steels to a detailed analysis of die failures and relates die life to die heat treatment. This article is scheduled to appear in the July 21 issue.

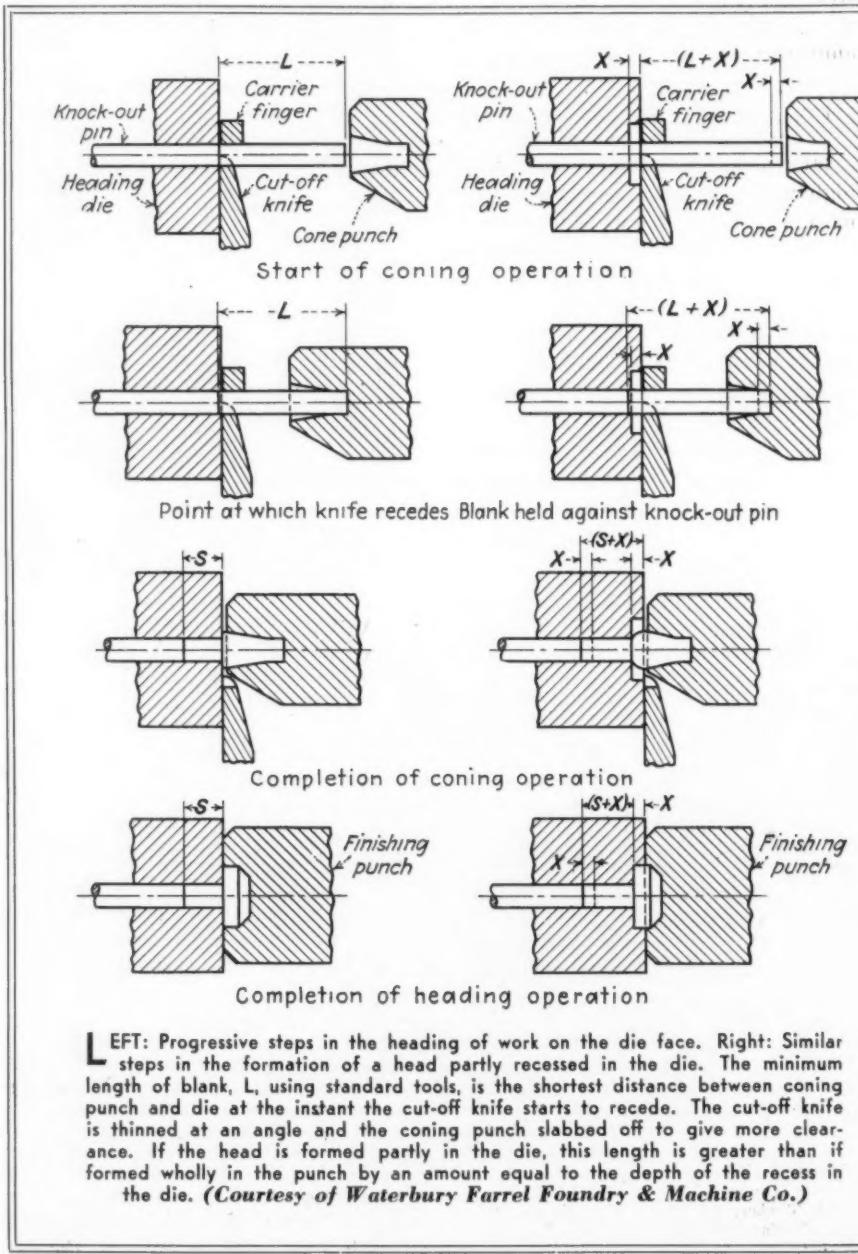
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THERE is probably no other line of manufacturing where tool life is so vital to success than in the production of screws, bolts, rivets, and nuts by the cold heading process. A primary factor in obtaining good production on tools is quality tool steel, and the right grade for each application. Other important factors are proper heat treatment and method of quenching, design of tools, and uniformity of the stock that is worked up. Die life is also affected by the nature of the operation and the composition, hardness and finish of the stock being formed. If the coating is bad, the dies will wear out quickly. With all these variables involved, it is not surprising to find rather wide variations in die materials and particularly in die life. There are a number of types of die failures that will be discussed at length in a future article, but assuming that the life is limited only by the wear on the die, the question of allowable tolerances becomes a determining factor. It is also obvious that on difficult work, or on extremely tough materials, like stainless steel, shorter die life may be expected.

When conditions are normal, using

an SAE 1020 type of wire for making machine bolts, rivets and screws, a production of about 100,000 pieces per die should be expected. By using a properly selected grade of die steel, carriage bolts of SAE 1035 wire, where a relief attachment is used, may be expected to produce about 50,000 pieces per die, where the nominal tol-

erance is 0.004 to 0.008 in. Special carriage bolts of the same material, where the tolerance is only 0.002 in. will reduce this figure to 30,000 pieces. On the other hand, the use of high speed steel inserts for machine bolt production has been known to run the die life up to 150,000 pieces, and there is a definite trend toward this prac-



Practice--III

By FRANK J. OLIVER

Associate Editor, *The Iron Age*

tice. As many as 250,000 pieces have been obtained where a wire drawing attachment is applied, such as described in the preceding article.

Extrusion Dies

Most cold headed bolts and capscrews have the threads rolled upon them, an extremely fast process in

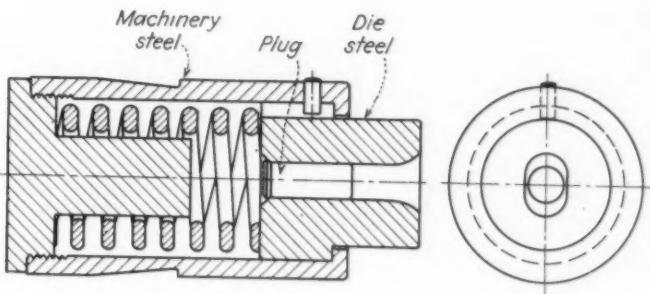
which the material in the valleys is forced up into a burr or hill on each side. Since the outside diameter of the thread is usually the same as the shank or unthreaded portion of the bolt, it is necessary to reduce the threaded portion to the pitch diameter by extrusion, instead of working from the o.d. as in the example of a cut

thread. Such extrusion can be performed in combination with the heading operation or with the subsequent trimming operation. Air or oil hardening high-carbon, high chrome die steels have been used for this work, but the trend today is toward the use of cemented tungsten carbide extrusion inserts in the stationary die. High carbon, high chrome dies combining single extrusion on machine bolts may be expected to give a life of 75,000 pieces, or 50,000 when close tolerances are demanded. On extrusion dies made of tungsten carbide, on the other hand, the life expectancy of these inserts is over a million pieces, with limits on size of not over 0.002 in. A typical carbide extrusion die is illustrated. This is a two-stage type for a special automotive application.

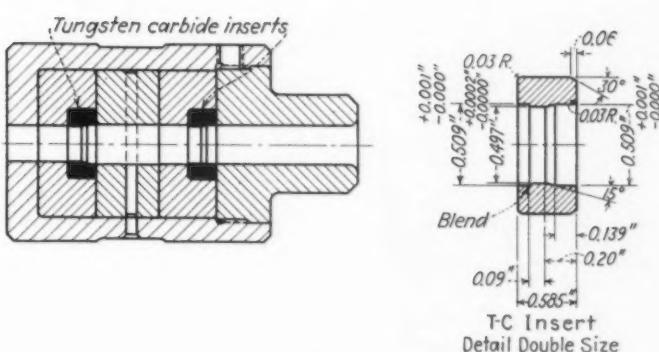
Sizing with the aid of a carbide extrusion die in a reheader is being used by one automobile manufacturer to replace a grinding operation. The piece is a short capscrew that also is called upon to act as a dowel in fastening and registering silent chain sprockets to camshafts. Limits on the extruded shank are held to 0.002 in., and the finish is better than on the ground job. In this example, however, the thread is cut instead of being rolled.

This same manufacturer generally specifies pitch diameter wire and rolls the threads right up to the head on all cap screws under 1 in. long. On other work, however, carbide extrusion dies are being used prior to thread rolling and some remarkable die records have been achieved. On a light extrusion job (reduction in diameter, 0.006 in.), for example, a cemented carbide die has turned out over 8 million pieces.

Any solid die machine will lend itself to extrusion work, although it is often carried out during the trimming operation. It has not been found practical to extrude bolts in the ordinary open die headers on account of the tendency to bend the shank after the gripping dies open and before the



WHERE over four diameters of wire length is flowed into a head cold, a collapsible upset punch, such as the typical one shown, is used. Such a tool also makes it possible to handle shorter blanks than with standard tools.



EXAMPLE of a double extrusion die, taken from the Ford Motor Co. Two tungsten carbide inserts are shrunk into place in die block hammer steel holders which are supported in a heat-treated shell, with a non-shrinking chrome steel spacer between them. Relative extrusion die diameters are 0.497 in. for the front and 0.466 in. for the rear die. Tolerances are +0.0002, -0.0000 in. These carbide inserts are 1/8 in. in diameter and 0.585 in. deep. The nib is shown double size of that in the assembly.

blank can be ejected from the extrusion die bush. In the National open die machine, however, the solid bush is gripped by and held in proper alignment with the dies and when this pressure is relieved, the bush is free and the blank can be ejected in the usual way without any cramping tendency.

Since severity of upset governs to a large extent the number of pieces that can be made from a die, care should be taken in comparing operating results. Bolts with square shoulders under the head are more difficult to upset than those without shoulders. A button shaped head shows a larger production than a cone shaped head. Thin heads shorten die life. The easier the shape for the metal to flow to fill the die, the less severe the service, so that die design plays its part also. The presence of sharp corners shortens die life and the use of a small radius in such corners has been known to double the die life. Usually a die with unavoidable sharp corners has to be heat treated to a lower hardness number than a standard die to avoid cracking, and this practice necessarily involves a sacrifice in productive life.

Die Steels

There are two commonly used types of steel for cold header dies; namely, the straight carbon and carbon-vanadium types. The following are typical chemical specifications in per cent:

	Straight Carbon	Carbon-Vanadium
Carbon	0.95-1.00	0.95-1.00
Manganese	0.20-0.30	0.25-0.35
Phosphorus and sulphur	0.02 max.	0.02 max.
Silicon	0.15-0.30	0.20-0.30
Vanadium	none	0.20-0.30

Some users prefer the straight carbon steel, especially those heading non-ferrous metals. Sometimes a higher or lower carbon content is used, but 0.95 to 1.00 is most popular. The carbon-vanadium type is preferred for the more severe jobs in steel. In fact, one automotive manufacturer, who uses a die steel such as that mentioned above for ordinary work, on tougher jobs tends to go to even higher carbon content, higher vanadium and lower manganese. Such a steel would be specified for a die for making connecting rod bolts.

The die steel is furnished in the hot rolled, normalized and annealed condition, with a spheroidal structure, and all bars are subject to the deep etch test. Some customers prefer to order the stock cold drawn or ground

to a close tolerance so as to eliminate necessity of taking a cut on the O.D. in making up the dies.

For small dies (1 1/4 in. round and smaller) in general a shallow hardening steel is desirable, although the depth of hardening is somewhat dependent on hardening temperature. For larger dies, open dies, and heading punches a deeper hardening steel is preferable in order to resist sinking of the case under heavy pressures. A deeper case may be obtained by higher hardening temperatures. Case depth usually ranges from 0.094 to 0.188 in. although this may vary with the shape of the impression. Sometimes deep hardening, shock-resisting steels are used for heading punches where failure is likely to be from sinking of the case.

Apropos of these general remarks is the specific practice of one of the large farm implement manufacturers, who for dies of 3 to 4 in. diameter, specifies steel of either of the compositions:

Carbon	0.90-1.00 per cent
Manganese	0.30-0.50
Sulphur	0.025 (max.)
Phosphorus	0.025 (max.)
Silicon	0.30-0.50
or	
Carbon	0.90-1.00 per cent
Manganese	0.20-0.30
Sulphur	0.025 (max.)
Phosphorus	0.025 (max.)
Silicon	0.15-0.30
Chromium	0.20-0.25
Vanadium	0.15-0.25

and meeting the following fracture and hardenability requirements:

Quenching Temperature	Grain Size of Case Max.	Case Depth (inches)		Hardness Rockwell "C" Min.
		Min.	Max.	
25° F. above Ac.	8	0.12	0.16	58
125° F. above Ac.	7	0.18	0.22	58

For dies under 3 in. diameter, a steel of the following composition is specified:

Carbon	0.95-1.05 per cent
Manganese	0.20-0.30
Sulphur	0.020 (max.)
Phosphorus	0.020 (max.)
Silicon	0.15-0.30

with a hardenability requirement as follows:

Quenching Temperature	Grain Size of Case Max.	Case Depth (inches)		Hardness Rockwell "C" Min.
		Min.	Max.	
25° F. above Ac.	7	0.10	0.15	58
125° F. above Ac.	6	0.12	0.17	58

It is apparent from these specifications that the heat treatment of the dies is very important. Hardenability as applied here is the ability of the steel to have a uniform and minimum specified hardness after a given heat treatment and to harden to a certain depth in a standard size sample. This particular company uses as a sample a bar 1 in. round and 2 3/4 in. long, and measures the depth of case by grinding the cross-section and etching in a

1:1 hydrochloric acid solution. Since the heat treating of the sample is practically identical with the practice for hardening the die itself, it will be described in detail.

The test specimen is heated in a furnace with a controlled atmosphere, preferably electrically heated. The furnace is first brought up to 1300 deg. F., the samples are put in and the source of heat is cut off for 15 min. The furnace is then brought up to the quenching heat in 1 hr. and the temperature is held there for 1 1/2 hr. The rounds are then quenched in a 10 per cent brine solution, held at 60 to 70 deg. F., and then immediately placed in the draw furnace and held at heat for 1 hr. Before hardness readings are taken on a Brinell machine, at least 0.010 in. is ground off the surface to remove decarburized skin.

Commercial Heat Treatment

For commercial work, practice varies somewhat according to the size of the dies. Small dies are heated to about 1450 to 1475 deg. F. prior to quenching, and hammered at about 1460 to 1490 deg. The majority of large dies, however, are heated to 1525 to 1600 deg. In any event, the steel chosen should have a coarsening temperature that lies above the hardening temperature employed. Quenching is done in a fixture where brine under a pressure

Quenching Temperature	Grain Size of Case Max.	Case Depth (inches)		Hardness Rockwell "C" Min.
		Min.	Max.	
25° F. above Ac.	8	0.12	0.16	58
125° F. above Ac.	7	0.18	0.22	58

Quenching Temperature	Grain Size of Case Max.	Case Depth (inches)		Hardness Rockwell "C" Min.
		Min.	Max.	
25° F. above Ac.	8	0.12	0.16	58
125° F. above Ac.	7	0.18	0.22	58

of 25 lb. per sq. in. can be released against the area to be hardened in sufficient quantity to insure proper surface hardness and penetration. The dies are then tempered in a range of 450 to 500 deg. F. for about 1 hr. for each inch of diameter or thickness.

Due to the repeated impact to which cold heading tools are subjected, it appears that a steel that develops a hard case and a tougher, soft core is neces-

sary to absorb the shock, and that is why shallow hardening steels are used. Deep hardening steels usually fail by splitting of the dies, but where the case is too thin, sinking occurs.

It is essential that the steel going into these tools be well worked so as to have a uniform structure throughout, particularly for solid or hammer dies where the center gets the wear. Any defects that in minor amounts would cause no trouble in ordinary steel will seriously affect the life of a header die. Segregation, slag inclusions and infinitesimal blow holes will cause minute ruptures in the surface, which may result in spalling and cracking. Tool steel suppliers have developed improved methods of pouring and cooling ingots to overcome these ordinary defects. Some com-

ENDS of spring clips, before the rod is bent into a U-shape, are being extruded to the pitch diameter preparatory to thread rolling. This job is being performed at the Ford Motor Co. with tungsten carbide dies in either a double-ended heading machine, or as pictured, in a conventional crank press with two cam actuated extrusion dies. This press operates at about 45 strokes per min.



panies use a method which makes possible the separation and removal of the center section of the ingot in which inclusions and segregations have a tendency to concentrate.

Die Design

In a review of this kind, no attempt will be made to go into die design details, but a few typical dies are illustrated.

Economical Cleaning of Bolts and Nuts

By H. WEBER
President, Triplex Screw Co., Cleveland

AYEAR ago, due in part to the requirement for increased capacity (60,000 lb. per work day), we installed a specially designed Ideal washer made by N. Ransohoff, Inc., for cleaning bolts and nuts. The savings over former methods were very marked. The small washing machine used before provided for no rinse, left some oil on the work, causing carbon deposits when it was put in the Homo furnaces, and gave inadequate chip removal. The new installation obviates all these difficulties, and as the machine is practically automatic, except for loading, the reduction in labor cost alone will pay for the machine in another year.

Bolts from $3/16 \times 1/2$ to 1×8 in. are run through the Ideal washer. They are brought to the unit in tote box loads of 135 lb. Four to six make up a batch which is dumped on a vibrating hopper by a power skip hoist. This hopper permits the bolts to enter the machine gradually. A dam holds the proper level of hot water in the first section, where the work receives a soaking wash, and from which it passes into the screen without lifting or dropping. The parts are then transferred gently from one compartment to another with



FOUR to six tote boxes of bolts are being loaded into the power loading skip which dumps the batch into a vibrating feed hopper of this special Ideal washer. Homo furnaces are in the foreground.

no injury to threads. There is a spray wash with sufficient pressure to remove all chips, even in female threads, then a drain, a spray rinse and a final drain.

The machine is heated by a Maxon premix burner, having submerged

flues. In being returned to the reservoir, the water passes over chip pans, where all chips are retained. Basic cleaning compound is used in the wash section and a little also in the rinse section to prevent rust. About 30 lb. of compound are used per week.

What's New in Cutters, Small Tools and Gages

NAMCO die heads may now be used for end turning and forming by converting the tool into a hollow mill through the substitution of circular form cutters for the regular circular chasers, according to a recent announcement of the *National Acme Co.*, Cleveland. The set-up may also be used for combination taper turning and threading pipe, chamfering, recessing and necking operations. Stationary or revolving types are offered, ranging from $\frac{3}{8}$ to $4\frac{1}{8}$ in. for the former and from $5/16$ to $4\frac{1}{8}$ in. for the latter.

Cutters are held to the mounting blocks through double serrated bushings that allow the cutters to be set ahead very small amounts for each grind, increasing the number of grinds and hence cutter life. Up to 270 deg. of surface is available for grinding. Positive adjustment to work diameters is made by the slide blocks without disturbing the cutter set-up.

Bar Turner

A SINGLE cutter bar turner is being offered by the *Gisholt Machine Co.*, Madison, Wis., for use on

certain sizes of its ram type and high production turret lathes. It is said to be a rigid tool capable of taking accurate high speed cuts. A graduated micrometer screw facilitates setting to exact dimensions after the tool has

been roughly set to center by hand scale. The cutter is held in a hardened steel tool block which is clamped rigidly to the body by cam action when in cutting position. Tool slot is of sufficient size to accommodate large shank cemented carbide tools. The operating lever retracts the tool $1/32$ in. to prevent marring when backing off the work.

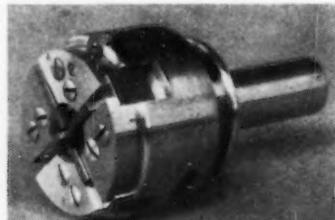
The roller bracket is one assembly, with the rollers held against the adjusting screws by spring pressure. Rollers can be set to lead or follow the cutter (for burnishing), and are mounted on needle bearings, with provision for lubrication.

Chaser Die Head

A NEW size of H & G insert chaser die head for rotary spindles has been developed by the *Eastern Machine Screw Corp.*, of New Haven, Conn. Known as size No. 00 style MM, it is designed primarily for Davenport automatic screw machines and uses the same insert chasers as in the No. 00 style DM heads for No. 00

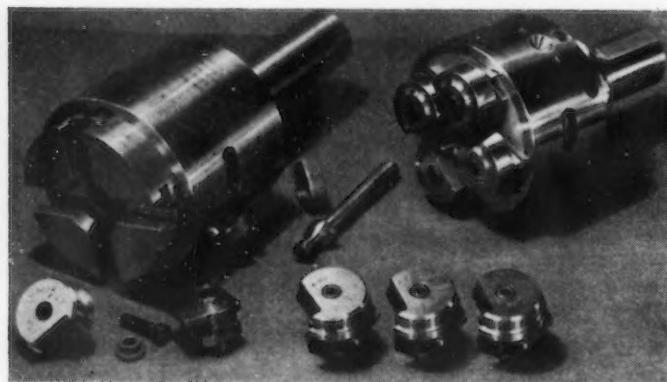


THE Gisholt single cutter bar turner has a number of refinements.



THE No. 00 style MM H & G insert chaser die head was designed primarily for application to Davenport automatic screw machines.

• • •



AT LEFT
CIRCULAR form cutters applied to Namco die heads convert them into hollow mills for end turning and forming.

• • •



THIS Firthite tipped Huther saw is shown cutting a Micarta laminated plastic steel mill bearing.

B. & S. automatics. The standard unit comes with a hardened shank to fit the threading spindle of the Davenport automatic. It has a capacity up to $\frac{3}{8}$ in. diameter, but the body of the tool is only $2\frac{1}{8}$ in. in diameter. It is especially suitable for brass work where production rates are 1 sec. or slightly over.

Carbide Tipped Saw

TUNGSTEN carbide tipped circular saws for cutting non-ferrous metals, fibers and plastics have been developed by the *Huthers Brothers Saw Mfg. Co., Inc.*, Rochester, N. Y. The saw is segmented, five teeth to a segment, and each tooth is tipped with a Firthite sintered carbide tip made by the *Firth-Sterling Steel Co.*, McKeesport, Pa. In the event of damage to a tooth, a segment may be replaced quickly.

Flaring Tool

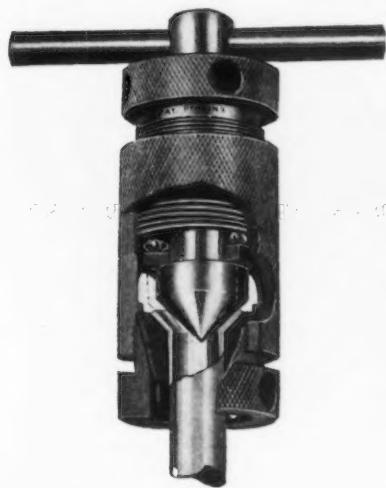
A TOOL for flaring copper tubing from $\frac{3}{16}$ to $\frac{3}{4}$ in. in size is announced by the *Rinsdale Mfg. Co.*, 427 W. Randolph Street, Chicago. It

is said to roll and burnish the flare to a smooth surface, instead of compressing it, with resulting roughness. This effect is obtained by a ball bearing cone eccentrically mounted on a shaft supported in a feed screw. When the feed screw is turned, the cone rolls the lip of the tube against a forming surface on the holding collet. Turning the cone shaft independently of the feed screw burnishes the surface. The tool is furnished regularly with four collets ranging in size from $\frac{1}{4}$ to $\frac{5}{8}$ in.

Floating Tool Holder

IMPROVEMENTS have recently been made by the *Wayne Tool Co.*, Waynesboro, Pa., in its floating tool holder suitable for use in either a horizontal or vertical position on turret lathes, boring mills, drill presses, and like equipment. The absence of a shoulder permits closer grouping of the spindles on multiple spindle machines and on automatic screw machines permits further penetration of the turret. Floating movement is pro-

INCLUDED in this review of recent announcements of the suppliers are turning tools for automatics and turret lathes, a small chaser die head, carbide tipped saws and drills, a compact type of floating tool holder, flaring tool for tubing, special chuck for cluster gears, stamp holder for marking tubing, an electric etcher for marking tools, and a number of wrenches and screw drivers. Among the gages are found a new design of dial gage, together with an adapter, gear measuring blocks, measuring wires for screw threads, angle gages and new forms of hardness and stiffness gages.

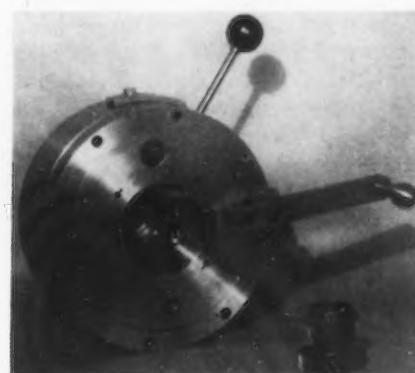


ABOVE

FLARING and burnishing are combined in this Rinsdale tool for application to copper tubing up to $\frac{3}{4}$ in. diameter.



A FEATURE of the Garrison cluster gear chuck is the provision for opening the rear set of chuck members to allow the clutch ring to pass and permit chucking on the smaller gear of the cluster as well as the larger gear.



AT LEFT

THE Wayne floating tool holder, which may be used in either a horizontal or a vertical position, has no shoulder.

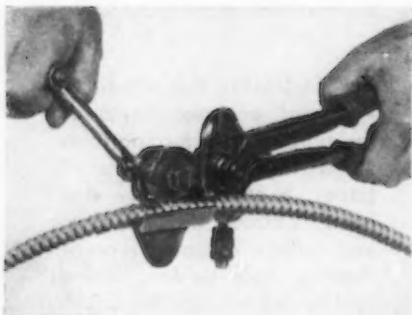


NEW type of Carbonyl flat drill for making holes in concrete, brick and tile.

AT RIGHT

WILLEY'S carbide tipped drills are also intended for non-metallic materials like concrete.





THE ABX safety cable cutter, made by Mechanical Products Corp., Port Chester, N. Y., and marketed by Ernest W. C. Toepper, 2 Broadway, New York, has a high-speed steel circular saw for cutting armored cable without damaging the insulation in the interior. Depth of cut is controlled by two knurled check nuts, and the cable is supported in an adjustable V-block. A pair of shear blades are a part of the tool. The incision made by the revolving saw is a diagonal cut, and the shape of the armor is said not to be distorted.

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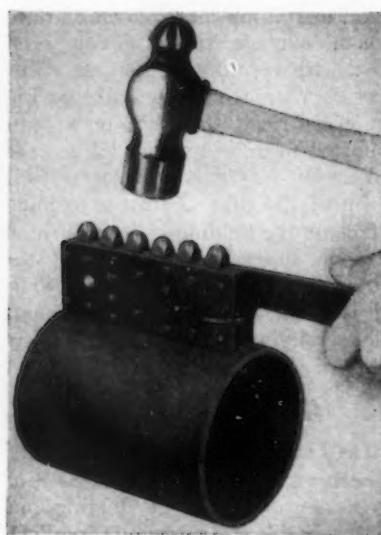
ford, Ill., has changed the name of its "Masterall" inserted-blade expansion reamers to "Pinwedge," a designation that describes the means of locking the blades in the body. The tool was described and illustrated in the April 7 issue of *THE IRON AGE* on p. 46.

Duplex Chuck

A DUPLEX chuck for cluster gears has been designed by the *Garrison Machine Works, Inc.*, Norwood Power Building, Dayton, Ohio, in which it is possible to chuck on any two gears of a cluster, regardless of their position or size. Two operating levers are provided. The rear ball handle is first actuated to bring the chuck members into mesh with the rear gear of the cluster; then the front operating lever is moved and both front and rear sets of chuck members simultaneously operate to center the cluster true with the pitch line and clamp it securely. The chuck unit can be mounted on machine adapters or faceplates. The operating handles are removable when used on rotating machine spindles.

Concrete Drills

A 50 PER CENT increase in drilling speed in concrete, tile, brick, marble, asphalt and other non-metallic construction materials is said to be possible with a new flat drill which has a Carboly tip. This new drill has been announced by *Carboly Co., Inc.*, Detroit, for use in portable electric drills and hand braces. It has a wide range of industrial applications and can be used in plants for installing



THE Cunningham safety stamp holder is designed for marking steel tubing.

• • •

machinery, fixtures, signs, brackets, etc. It is also suitable for use in drill presses for machining non-metallic materials. The cemented carbide tip holds a sharp cutting edge through long periods of use, produces smoother, more accurate holes and eliminates difficulties ordinarily encountered in drilling glazed surfaces.

FOR similar application in portable electric drills or hand braces are the carbide tipped drills made by *Wiley's Carbide Tool Co.*, 1340 W. Vernor Highway, Detroit. They come in sizes from $\frac{1}{8}$ in. diameter by $2\frac{1}{2}$ in. long to 2 in. diameter by 6 in. long. The drills can be sharpened on any type stand grinder with any make of grinding wheel.

Tube Stamp Holder

THE M. E. Cunningham Co., 101 E. Carson Street, Pittsburgh, has recently perfected a safety tube stamp holder which has an extended handle to assure a firm grip of the holder and added protection to the operator. The means of holding the stamps in the holder is a simplified pin that extends through the pocket and is held in place by a spring fit. The stamps are slotted so as to hold in place when raised from the object to be marked. Safety steel stamps are used to prevent spalling or mushrooming. The holder is notched at the bottom to give a firm seat on the tube. The holder is also designed for stamping flat work.



UNIFORMITY in tightening of nuts is assured with the No. 66 Bonney torque indicating wrench.



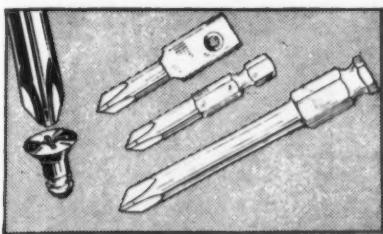
THE Armstrong AL-100 set of wrenches for hollow head screw consists of 10 wrenches, two reversible ratchets, three sliding T-handles, two extensions and an adapter.

• • •

Wrenches

TO assure the proper installation of pipe flanges, couplings, cylinder heads and the like through equalized bolt tensions, the *Bonney Forge & Tool Works*, Allentown, Pa., has introduced the No. 66 torque indicating wrench. The wrench is operated as any ordinary ratchet wrench and when the preset torque is reached the ratchet locks and a sharp click is heard. An indicator is first set to the desired torque in foot-pounds. If the torque is the same, it is only necessary to move the ratchet lever over to the left after each successive operation.

THE James R. Kearney Corp., 4200 Sarpy Avenue, St. Louis, is featuring a wrench with self-adjusting jaws that take hold of the nut and automatically grip as leverage is applied on the handle. These Masterwrenches are made in lengths of 6, 8 and 10 in., with either smooth jaws or pipe jaws. The capacity of the smallest wrench is $5/16$ to $11/16$ in. and of the largest, $9/16$ to $1\frac{13}{16}$ in. The wrenches are made of chrome vanadium steel and are particularly recommended for tightening nuts in close quarters.



ABOVE

STANLEY power bits are now available for driving Phillips recessed head screws.

• • •

THE movement has been redesigned to eliminate friction in the new Federal V-8-I dial indicator with contact stem perpendicular to the face.

• • •



ABOVE

IDEAL Commutator Dresser Co. is now offering an electric metal etcher for marking tools.

• • •



SUPER TOOL CO., 356 E. Congress Street, Detroit, is now supplying circular and straight form tools tipped with tungsten carbide. Longer grind life, greater speeds and shorter machine down time are made possible.

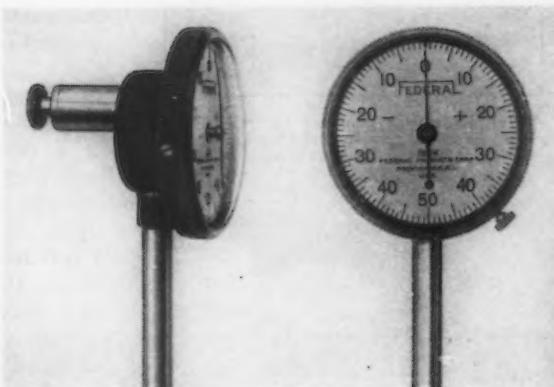
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Chrome vanadium tool steel is also used in the new line of hollow screw wrenches announced by *Armstrong Brothers Tool Co.*, of Chicago. These wrenches have detachable hexagonal drivers that fit into the hollow heads. Ten sizes fit all hex nut hollow screws and cap screws from $\frac{1}{4}$ to 1 in. in diameter. The reversible ratchets are drop forged, with hardened steel gears, and it is claimed have an improved action. All parts are chrome plated.

Screw Driver Bits

STANLEY TOOLS, New Britain, Conn., announces a complete line of power bits, ranging in size and design to cover the entire range of Phillips screws and for use with all types of electric, air and spiral screw drivers. These bits are made of alloy steel, tempered and hardened to give the ultimate in strength and long-wearing qualities. Stanley also makes a variety of hand screw drivers and bits for braces to fit all sizes of Phillips screws.

Stanley Tools is also offering a new No. 1017 instrument screw driver for small work. The handle is made of Stanloid, a tough, non-metallic substance, and is of hexagon shape. The



• • •

IDEAL Commutator Dresser Co. is now offering an electric metal etcher for marking tools.

equipped with an oilite bushing in the $\frac{3}{8}$ in. stem diameter so that over-lubrication is avoided. The indicator is graduated in 0.001 in. and has a range of 0.100 in.

THE *Brown & Sharpe Mfg. Co.*, Providence, has recently announced two new hole attachments to adapt dial indicators to testing internal and other surfaces that cannot be reached with the spindle of a dial gage. They are attached to the gage by a clamp with knurled screw. A desirable feature is the adjustable fulcrum screw by which play in the arm can be eliminated.

Hole attachment No. 729A is suitable for use in holes up to $1\frac{11}{16}$ in. deep, whereas the No. 729B attachment is for use in shallow holes or for rough grinding or boring operations, as the tendency to chatter is reduced with the short arm. It will enter a hole to a depth of $1\frac{3}{16}$ in.

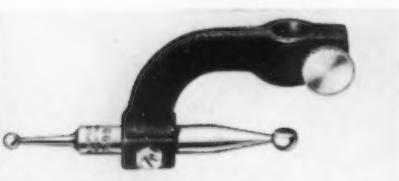
THE *Illinois Tool Works*, 2501 N. Keeler Avenue, Chicago, is now offering gear measuring blocks to be used in conjunction with micrometers for checking the pitch diameter and tooth thickness of spur or helical gears of either involute or stub tooth systems. Each set consists of three blocks, two males and one female, and is made for a specific pitch and pressure angle. Two male blocks are used for gears with an even number of teeth, and a combination of one male and a female for gears with an odd number of teeth. Variations in the form of the involute do not affect the reading, as the blocks always contact the line of action. The

Gages

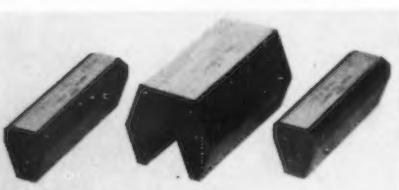
AN improved indicator, designated as the V-8-I, in which the contact spindle is perpendicular to the dial, is announced by *Federal Products Corp.*, 1144 Eddy Street, Providence. In this model a crown gear is used in place of a spiral to change the direction of gear movement, resulting in a more sensitive and more accurate indicator. This indicator is also



THE Kearney Masterench has self-adjusting jaws that automatically grip the nut as leverage is applied.



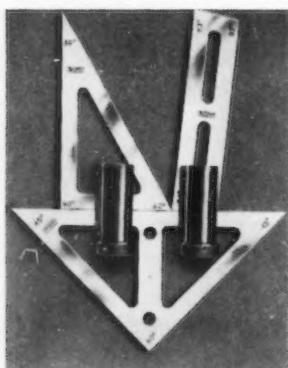
B. & S. has brought out two hole attachments for adapting dial gages to measuring internal bores. This is the smaller size, No. 729B.



PITCH diameter and tooth thickness of spur and helical gears may be measured with the Illinois measuring blocks.



A COMPLETE set of high-speed steel measuring wires for screw threads is announced by the Van Keuren Co., 10 Copeland Street, Watertown, Mass. The set, known as assortment No. 20HS includes "Best Size" wires which touch at the pitch diameter for pitches of 6 to 36 th. per in. An increase in life of 300 per cent over carbon steel wires is claimed.



TAFT-PEIRCE Mfg. Co., Woonsocket, R. I., announces a new set of angle gages suitable for any angle up to 180 deg. by 5 min. increments. Set comprises three triangles and seven parallel blades having supplementary angles at each end. The angle members are fixed in combination by a novel clamping device, shown in use. All gages are made of tool steel, hardened and ground to precise limits. Total error of any combination is said not to exceed 1 min.

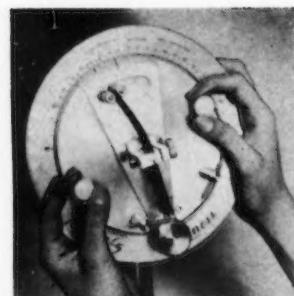
mathematical formula involved is simple and easily understood.

Hardness Tester

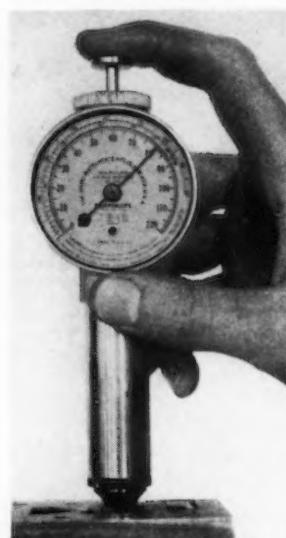
A POCKET size indicating hardness tester, only 6 in. long and weighing less than 1 lb., has been developed by the *Shore Instrument & Mfg. Co.*, of Jamaica, N. Y. Fashioned somewhat after the well known model D dial indicating Scleroscope, this instrument has the same Shore-Brinell conversion hardness scale as is found on the larger model. A diamond pointed hammer is used, together with an improved clutch mechanism. In use, the instrument is placed on the work and the button on top of the barrel pressed down. The pointer automatically indicates the hardness on an enclosed scale. With suitable attachments, tests can be made in a bench vise on a surface plate, as well as free handed.

Stiffness Gage

FOR the measurement of the stiffness and resilient qualities of paper, coated fabrics, light metallic sheet and wire, the *Taber Instrument Co.*, North Tonawanda, N. Y., has developed its V-5 stiffness gage and triple-cut shear. The shear blanks out test specimens accurate to size. The gage operates on the pendulum weighing system. When the load is applied to the free end of the specimen by manual rotation of the loading disk, a torque is imposed on the holding means that is accurately weighed by the deviation of the pendulum from the vertical. The scale is calibrated in gram-centimeters.



STIFFNESS and resilient qualities of paper, coated fabrics, light metallic sheet and wire can be measured in the new Taber pendulum type stiffness gage.



THIS Shore pocket size instrument, only 6 in. high, automatically indicates the hardness of metals in either Scleroscope or Brinell readings.

Steel Pipe Lined With Inert Sulphur

SPAKING at the Dallas, Tex., American Chemical Society meeting, Isaac Bencowitz, of Texas Gulf Sulphur Co., described applications and manufacture of steel pipe lined with sulphur.

The interior of the pipe is first coated with a bituminous material. A steam heated core of a proper size is centered in the pipe and a mixture consisting of molten sulphur and aggregate is poured into the annular space. After the mixture has solidified, the core is removed, leaving a pipe with a homogeneous interior coating of sulphur.

Sulphur pipes are unaffected by changes in temperature, and are resistant to many corrosive liquids. Pipes made of sulphur combined with an ag-

gregate have been exposed to extremely corrosive "bleed water," containing salt, sulphides, sulphates, etc., for more than two years without signs of deterioration. Sulphur lined steel pipe has been used for the conveyance of salt brine and after three and one half years of service are still in good condition. In such service, plain steel pipes have been known to fail in four months.

Sulphur pipe can be made to withstand an internal pressure of 95 lb. per sq. in.; they have a crushing strength of 860 lb. per sq. in. The chemical inertness of sulphur and its insulating properties may prove of value in handling many of the very corrosive liquids encountered in industry.

Deep Drawing and Pressing Problems*

By J. D. JEVONS

WHEN deep drawing or pressing, a blank of soft sheet metal is placed on a die or draw ring having a smooth top surface which may be flat, conical or of curved contour. This die contains a hole of a shape which corresponds to that of the article it is desired to produce, and the dimensions of the radius of the edge of the hole relative to the thickness of the metal being shaped are of considerable importance. The more smoothly polished this radius is, the better; for irregularities tend to result in three difficulties: (1) a rupture of the film of lubricant which is supposed—and supposed is said advisedly—to prevent actual metal to metal contact between the die and the sheet sliding over it, (2) scoring of the sheet surface, and (3) a hindering of the flow of metal, which thus increases the stress in the walls of the drawn portion of a shell and makes failure more likely.

A punch having a cross-sectional outline similar to that of the hole in the die, but of slightly smaller area and having its axis normal to and accurately centered in the die, is then forced down into the hole in the latter, as indicated in Fig. 1. If all goes well, the metal sheet flows over the die radius and follows the punch in the desired manner. But, if this does

not happen, one of the deep drawing problems to be considered herein arises and demands solution.

The punch may push the blank right through the die, as shown to the left in Fig. 1 or, as shown to the right, it may descend to a pre-determined depth which will leave some of the blank in its original plane above the die but, of course, thickened considerably due to the contraction its periphery will have suffered. The arrangement shown in Fig. 1 works quite well if the gage of the sheet is fairly heavy in relation to the size of the article being formed, because the crowding-up which occurs as the periphery of the blank gradually becomes smaller results in a uniform increase in thickness. When, however, a thin sheet is used, the tendency is for the metal which has not yet flowed over the radius of the die to wrinkle into a series of waves, instead of increasing the thickness uniformly. To avoid this, it is customary to load the upper surface of the blank with what is known as a pressure plate or blank holder, as indicated to the right in Fig. 2. The purpose of the plate is to press the blank into contact with the top face of the die with such a force as to not seriously hinder the flow of metal but will at the same time cause the blank to thicken uniformly and prevent it wrinkling. Naturally, an important problem is to determine exactly the correct pressure on the blank holder. It is not strictly a metallurgical problem, yet

it should be mentioned here, as incorrect pressure plate loading is sometimes responsible for the actual failure of good quality metal, and nearly always limits the depth of draw which can be obtained.

As the blank thickens during its progress over the face of the die before flowing over the radius, it is obvious that the pressure plate cannot be mounted rigidly. In the past, it was customary to arrange loading by spring pressure. More recently, pneumatic rams, or as they are sometimes termed, cushions, often without the assistance of springs, have been used to exert force upon the pressure plate. The advantages of the newer methods of operation are (1) they enable the force to be varied more quickly and more accurately than is possible with springs, and (2) it is possible to arrange for the load on the pressure plate to be automatically decreased during the actual stroke of the press. If a recording manometer is attached to a pressure plate, the record traced as a draw proceeds will be of the shape shown in Fig. 3. Clearly, if the loading on the plate were to remain constant, the blank would be loaded unduly heavily during the final stage of the draw.

Most frequently, wrinkling of a blank is usually a defect to be prevented, but because the wrinkling is usually surprisingly regular, there are occasional instances where it can be utilized for decorative purposes.

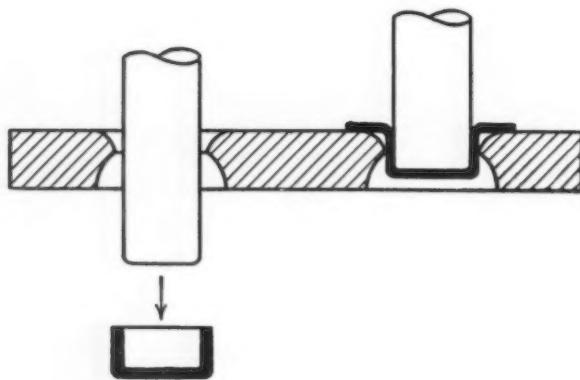
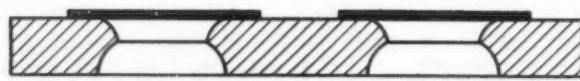
At this point, it would be well to

*Abstract of lecture presented before Birmingham Metallurgical Societies, Birmingham, England, March 31.



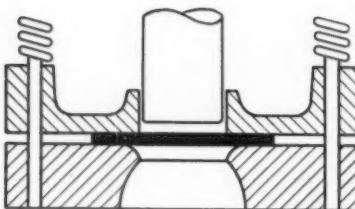
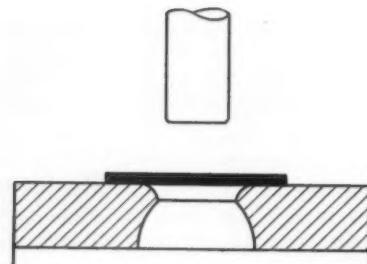
AT LEFT

FIG. 1—The punch may push the blank right through the die (left), or may stop at a pre-determined depth (right).



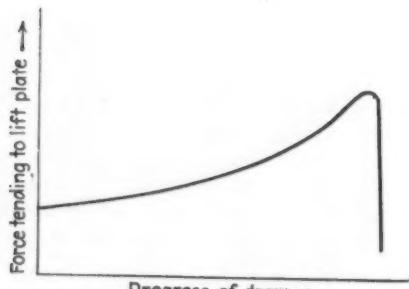
BELOW

FIG. 2—The die on the left has no pressure plate, and the blank is unrestrained. On the right, a spring loaded pressure plate prevents the blank from wrinkling.



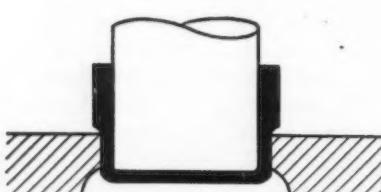
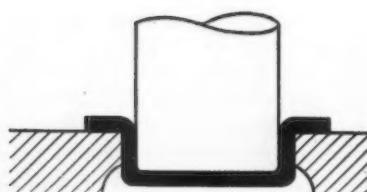
AT LEFT

FIG. 3—As a draw progresses, the force on the pressure plate varies, as this curve shows.



• • •

FIG. 4—The operation to the left could be termed pressing, whereas that to the right could be designated as drawing.



define the terms "deep-drawing" and "pressing"; for they are confused on all occasions even by plant men of long experience. In Fig. 4, it is better to think of the operation on the left as pressing, the essential point being that there is clearance between the metal and the tools, and that the metal is, therefore, thinned only by reason of such elongation as it may suffer due to the action of tensile stress. The term "drawing" should be reserved for the condition depicted to the right in Fig. 4, in which the space between the tools is less than the thickness of the metal entering this space, and the metal is thinned not solely by tensile stress but also by definite mechanical pressure. This process is known technically as "ironing," and is akin to the actual drawing suffered by a tube which, supported by a mandrel or plug, is drawn through a die.

It is usual, in the majority of presses, for reciprocating motion to be imparted to the punch by means of a crank and connecting rod which actuate a cross-head or slide. The overwhelming popularity of the crank operated press is due to its simplicity and speed of operations, yet the fact must be faced that, considered from the metallurgical aspect, it is the least satisfactory of any; for a crank actuated punch must move with a velocity which changes throughout its stroke in accordance with the laws of simple harmonic motion, as indicated in Fig. 5. This continually changing speed is most undesirable in theory, and there is also abundant experimental and practical shop experience to show that, except in special circumstances, the replacement of crank actuation by rack and pinion or fluid pressure ram actuation, other conditions remaining unchanged, enables a deeper draw to be produced consistently.

Another serious and often unappreciated fault of the crank press is that the punch, at the instant when it strikes the metal, is usually approaching the mid-point of its stroke, and is therefore moving at nearly its maximum velocity. If this velocity is high, there is a strong tendency for the resulting sudden impact to tear the bottom out of a partly drawn cup, and this tendency limits both the speed at which the press can be run and the severity of the draw which can be inflicted. Fig. 6 is an attempt to illustrate this point. In the first operation only a small clearance space marked C_1 , is needed to allow a flat blank to be placed in the tools. If the

stroke of the press is arranged to be not much greater than the depth of the draw, it is therefore possible for the velocity of the punch when it strikes the metal, the velocity being indicated by V_1 , to be much less than the maximum. In the re-drawing of a shell, a much larger space, indicated by C_2 , is needed to allow the shell to be placed in the tools, and it is often impossible to prevent the punch from striking the metal before it has reached a velocity indicated by V_2 , which is but little removed from the maximum. Sudden impact can be prevented if the punch is lowered into gentle contact with the metal before the stroke proper is begun. In theory, this can be done by means of a slipping clutch, but it is a practice which would greatly increase the time cycle for each complete stroke of a press, and for this reason the possibility of its general adoption in the industry is remote.

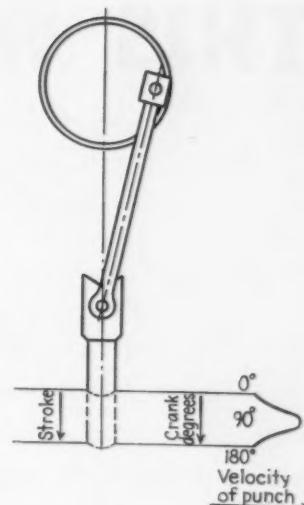
In view of the inherent defects of crank actuation, it is natural to ask what other methods can be utilized to impart movement to the punch. The answer is, several, but only two others are used on an industrial scale, namely, the rack and pinion, and a ram actuated by fluid pressure. Presses in which the punch is actuated by a rack and pinion are used to a limited extent, particularly in tube drawing. In such equipment, the velocity of the punch is uniform, but unless the drawing speed is slow, the metal is still subjected to shock stresses when the punch first strikes it.

The use of fluid pressure as a means for imparting movement to the punch has increased rapidly during the past few years, particularly in America. The advantages are many. The speed of the punch is normally uniform, but it can be varied during the actual stroke in any desired manner. A release valve can be set to operate so that excessive pressure cannot be applied, and a by-pass from the fluid pressure system can be taken to operate the pressure plate and provide a convenient means for altering the applied load as the stroke proceeds. In view of these advantages, the development of the fluid pressure type of press should be watched very closely.

Turning to the problems of defects found in purchased sheet, the most common defect in steel sheet at the present time is what, in many press shops, is termed "lamination." This is usually caused by the presence in the sheet of the residue of a pipe in the original ingot, although sometimes large masses of non-metallic inclusions

not located in the major pipe cause a similar, but more localized effect. This type of defect is usually attributed by the user of sheet to insufficient cropping of the ingot. Very often he is right, but it must be remembered that most steel sheet is rolled from rimming ingots, and that in these the major pipe tends to be smaller and less sharply defined than in killed steel ingots. Due to their nature, there is a tendency for rimming steel ingots to contain cavities other than in the main pipe, and it is these which form localized discontinuities in the rolled sheet.

The chemical composition of steel sheet rarely causes trouble. Occasionally the carbon content is higher than usual, thus reducing the ductility.



ABOVE

FIG. 5—A crank actuated punch moves with a velocity which changes throughout its stroke.

○ ○ ○

AT LEFT

FIG. 6—The variable speed of a crank punch results in sudden impact which often tears the metal. The arrangement at the top is an attempt to overcome the sudden impact at maximum velocity.

○ ○ ○

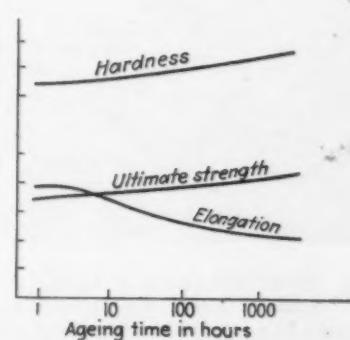
BELOW

FIG. 7—Age hardening results in the physical properties of cold rolled sheets, or shapes drawn from annealed sheets, to change with time.

but the proportion of impurities, determined as an average, is hardly ever responsible for failure. Localized segregation of impurities, particularly of phosphorus, is quite another matter, but it is doubtful if the impurities in commercial steel sheet will ever be reduced to so small an average value that localized segregation will not prove injurious.

Pronounced "coring" must be classed as a defect likely to cause failure, because its effect is to decrease the ductility of the sheet as a whole. The natural structure of

(CONTINUED ON PAGE 103)



THIS WEEK ON THE

By W. F. SHERMAN

Detroit Editor

ASSEMBLY LINE

... Mid-year sentiment presages good volume of production of 1939 models . . . Auto assemblies continue contra-seasonal upward movement . . . UAW factions believed too well matched for show-down . . . Union to present new demands to General Motors.

DETROIT.—Mid-year of 1938 finds sentiment in the automobile industry more bullish than it has been for nearly a year and a half. There are many concrete reasons: Labor is more settled in its ways, retail sales are improving, production is steady, inventories are low, material prices down, and preparations for new models are going ahead at an increasing tempo.

Last year, too, production was holding quite steady at this period, but the reason was different. Through part of June there had been a series of unauthorized strikes which proved to be just about the last of these sabotage tactics on the part of the UAW. The

industry was attempting, almost vainly, to catch up on the bank of orders for new cars which were on its books, but still was very fearful of new strike outbreaks which might upset its plans for new models. Moreover, in some companies there was great fear that material prices would continue upward, so they bought quite heavily for an anticipated big-volume year.

When the recession started the industry found itself with huge inventories.

Items which help to evaluate the industry's possibilities for the forthcoming year include the following:

This year the planners can go ahead

with some assurance that labor difficulties will not interfere with production plans; designs being made ready now are much more attractive than current models; these new cars can be offered at retail prices considerably lower than present list prices because there has been a general reduction in material costs.

Production activity last week in the automobile industry continued a movement contrary to the usual seasonal decline. Ward's Automotive Reports put assemblies at 40,945 units against 40,918 for the previous week and 122,890 in the same week a year ago when the season's peak was reached.

This week the effects of the holiday and shutdown of Ford Motor Co. (except on the engine reconditioning line) will reduce production sharply, a late estimate placing the probable figure at less than 25,000. Output should bounce up again in the week of July 11 and resume something approaching last week's schedule for a few weeks.

June production totaled about 175,000 cars and trucks. Estimates for July place the total between 115,000 and 120,000. In the second 10 days of June, sales reports from various automobile companies showed fair gains over the first 10 days of the month, with registrations at a level almost equal to the same period in May.

Packard reported that deliveries for all of June exceeded estimates by 20 per cent. "Deliveries of our larger, more expensive cars, the 12 and super-eight will be the highest of any month since their announcement last September," according to M. M. Gilman, Packard vice-president. This type of report from manufacturers of high-priced cars has been linked by some observers to the current improvement in the stock market and general business.

Some plans were changed last week. Ford had contemplated a complete shutdown, but at the last minute told vendors to deliver enough parts to keep the engine reconditioning line going. This is the section of the as-



A TIMELY photograph of Pontiac Motor Co.'s big pile of scrap. In the past week scrap prices in Detroit showed the biggest gains ever recorded. In three days some items gained \$3 a ton. With automobile production low, scrap output also has been at a low level.



C ONTINUOUS PERFORMANCE

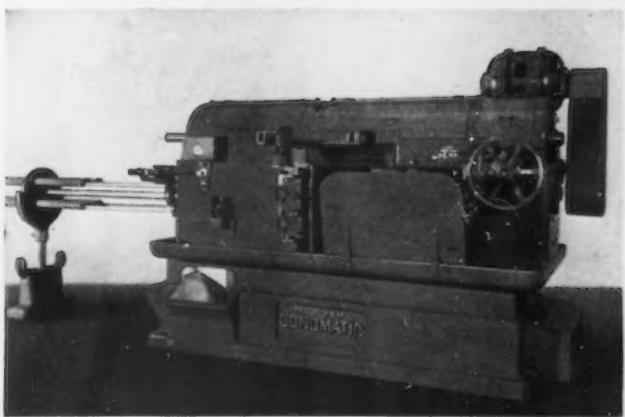
of small parts speeds up the work and keeps down costs of Crown Bottling Equipment, manufactured by the Crown Cork & Seal Co., Baltimore, Md. Filling Valve Bells, for example, are made on the 4-Spindle CONOMATIC shown here. It is entirely automatic. Nickel-steel bars are fed in at one end. Finished bells emerge at the other. And the bells are far more accurate than when formed on other types of machine tools. The above is typical of the results obtained by the use of CONOMATICS in a special industry.

CONOMATICS are also returning large dividends, per dollar invested, in all classes of production where precision parts are made from bar stock. We cordially invite you to submit your screw machine problems to us and to visit us at our plant.

Catalogs will be sent promptly on request. Write today.

**CONE AUTOMATIC
MACHINE COMPANY**

Windsor, Vermont



CAR AND TRUCK ASSEMBLIES

(U. S. and Canada)

		Corresponding Weeks	
		1937	1936
June 6-10	40,175	118,798	98,560
June 13-17	41,790	111,620	100,161
June 20-24	40,918	121,032	104,473
June 27-July 1	40,945	122,890	102,833
July 5-8		100,131	100,648
July 11-15		115,380	97,768
July 18-22		88,055*	99,329**
July 25-29		86,403*	97,755**

*Ford Closed

**Ford Operating

sembly plant where used engines are rebuilt.

Also, it has been learned, the Ford inquiry for "a sizable tonnage" of strip and sheet failed to materialize. It is probable that the present inventory will carry Ford through the rest of the 1938 program.

Homer Martin, president of the UAW, finally has brought formal charges against his five leading opponents, but failed to put in writing the charge made June 13, when he asserted that the suspended officers had

collaborated with officials of the Communist party on union business. And he did not press his claim that the five men were trying to seize control of the union. At the same time, a conference with John L. Lewis, which was reported to have been held in Washington a week ago, failed to persuade Martin to revoke his suspension orders.

The battle is just as bitter as ever, but it has been frankly conceded that the two factions are too evenly matched to seek a showdown.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



56—THE IRON AGE, July 7, 1938

It has been learned that the formal charges consist of accusations that the five suspended officers had refused to cooperate in a recent harmony program; that they had obtained money through the mails fraudulently and diverted international union money without authorization (this apparently refers to action of the five since they were suspended and tried to tie up union funds).

Tool and die makers in the Detroit area will be subjected to a further organizing campaign by the UAW, it has been announced. A week ago Martin appointed a national director and committee which will attempt to spread UAW to tool and die shops outside Detroit and through the nation.

New Demands on General Motors

A new set of demands which the UAW will make on General Motors Corp. before the 1939 production season begins was made public last Friday by the union. An amendment to seniority provisions of the General Motors agreement will be sought to protect seniority rights of workers who have been unemployed for more than 12 months. The present contract provides that one year of continuous unemployment breaks seniority, but the union contends that long slack periods keep many men from working for more than 12 months. They ask that the period be lengthened to include all time that plants are working on curtailed schedules.

The union will also attempt to coordinate programs and interpretations of the contract in General Motors plants in various parts of the country. They will seek standardization of hours, wages and condition in similar shops and plants, and will also insist in standardization of the process of timing jobs.

Perhaps one of the most important points which the union will bring up for discussion is the establishment of a "top committee," to be set up by the corporation to act finally and officially on grievances. This revision is aimed at doing away with negotiations with branch plant managers. The union has tried constantly to bring all its grievances to the "main office."

In making the announcement, William E. Dowell, UAW director for General Motors locals, praised the corporation for its experiment in one plant where it posted seniority lists on the bulletin boards. "This is one thing that will settle a number of things before they become grievances," he declared.

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	June 1938	May 1938	April 1938	May 1937	Five Months 1937	Five Months 1938
Steel Ingots: (gross tons)						
Monthly output ^a	1,806,805	1,925,166	5,151,909	24,574,237	9,180,867	
Average weekly output ^a	407,857	448,757	1,162,959	1,138,750	
Per cent of capacity ^a	30.39	33.44	88.79	84.86	
Pig Iron: (gross tons)						
Monthly output ^b	1,062,021	1,255,024	1,376,141	3,537,231	16,599,087	6,811,005
Raw Materials:						
Coke output ^c (net tons)	2,341,021	2,510,964	4,803,467	23,221,269	13,102,116	
Lake ore consumed ^d (gross tons)	1,711,146	1,853,658	5,321,011	24,715,312	9,244,627	
Castings: (net tons)						
Malleable, orders ^e	17,564	19,724	46,018	291,717	94,477	
Steel, orders ^e		21,869	68,688	540,373	
Finished Steel: (net tons)						
Trackwork shipments ^f	2,633	3,793	8,807	54,814	17,036	
Fabricated shape orders ^f	74,410	92,130	122,939	723,247	388,261	
Fabricated plate orders ^f	25,141	21,958	28,913	216,412	126,400	
U. S. Steel Corp. shipments ^f	465,081	501,972	1,304,039	6,345,724	2,532,297	
Fabricated Products:						
Automobile production ^g	210,183	238,133	540,377	2,396,315	1,116,633	
Construction contracts ^g	\$283,156 \ddagger	\$222,016 \ddagger	\$244,113 \ddagger	\$1,176,377 \ddagger	\$1,046,600 \ddagger	
Steel furniture shipments ^g			\$2,259 \ddagger	\$11,483 \ddagger		
Steel boiler orders ^g (sq. ft.)	733,678	474,931	1,015,282	4,793,138	2,884,516	
Locomotives ordered ^g	5	3	14	206	44	
Freight cars ordered ^g	6,114	3	3,903	44,562	6,933	
Machine tool index ^h	66.7	90.3	208.5	234.2 \ddagger	88.0 \ddagger	
Foundry equipment index ^h	90.6	79.3	237.6	248.1 \ddagger	94.9 \ddagger	
Exports: (gross tons)						
Total iron and steel ⁱ	540,639	489,202	969,211	2,716,041	2,603,658	
All rolled and finished steel ⁱ	109,459	129,252	164,215	731,297	617,168	
Scrap ⁱ	371,745	306,900	630,671	1,620,114	1,624,795	
Imports: (gross tons)						
Total iron and steel ^j	20,814	21,237	49,050	252,843	103,098	
Pig iron ^j	1,795	3,823	6,361	52,324	19,465	
All rolled steel ^j	16,194	12,761	29,031	147,273	71,186	
British Production: (gross tons)						
Pig iron ^k	633,900	661,000	696,300	3,311,700	3,463,900	
Steel ingots ^k	957,000	938,000	1,047,300	5,232,600	5,149,800	

^a Three months' average. [†] 000 omitted.

^b Source of data: *American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h Preliminary figures from Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; ⁱ F. W. Dodge Corp.—37 Eastern states; ^j Railway Age; ^k National Machine Tool Builders Association; ^l Foundry Equipment Manufacturers Association; ^m Department of Commerce; ⁿ British Iron and Steel Federation.

Weekly Booking of Construction Steel

	Week-Ended				Year to Date	
	July 6, 1938	June 28, 1938	June 7, 1938	July 7, 1937	1938	1937
Fabricated structural steel awards	16,855	11,625	18,750	16,500	357,225	656,490
Fabricated plate awards	310	495	3,775	595	69,235	75,880
Steel sheet piling awards	12,500	170	800	0	28,495	30,520
Reinforcing bar awards	1,425	11,000	2,660	7,400	119,925	131,085
Total Lettings of Construction Steel	31,090	23,290	25,985	24,495	574,880	893,975

THIS WEEK IN WASHINGTON

... Although Administration is on record against wage reductions, official Washington sees possibility of readjustment of labor costs . . . New system of basing points for steel causes mounting interest in investigations of anti-monopoly committee.

• • •

By L. W. MOFFETT

Resident Washington Editor
The Iron Age

• • •

WASHINGTON.—While the Administration in Washington is strongly on record against wage reductions, there is an underlying belief among officials that economic conditions at this time are too unsettled to determine whether readjustment of labor costs will be necessary. Organized labor itself, despite its natural and outspoken opposition to wage cuts, really shares the same sentiment and the same may be said for industry. The view is held that a trial period is at hand and that upon its outcome depends the solution to the question as to whether wages can be maintained or must be reduced.

The Administration itself, not overlooking the political effect, is pushing hard through its spending program to throw business to steel mills and other lines to stimulate activity and to build up profits as a means of fortifying them against the necessity of cutting labor costs. But, as large as are the sums going from the Federal Treasury, it is realized that relatively they are only a shot in the arm and that if the plant operations are to be measurably increased and sustained it will be necessary that large scale private buying be restored.

The chief source of Federal funds being used once again in an effort to

prime the pump is PWA. Aware that the country, by reason of past experience, is increasingly doubtful of other than temporary benefits to industry and labor from the spending program, PWA is seeking to break down this attitude by rushing out large allotments on projects ready to be started. The idea is to get the orders to industrial plants in as short a time as possible and thereby stimulate production and employment.

In steel alone, the PWA program for non-Federal projects contemplates an outlay of the ponderable sum of \$250,000,000. Taken over a long period, say one year, this is not a vast outlay for steel, but the thought is to get the business to the mills within a few months, so that if it spurs private buying it will be a big element in pushing up operations and employment, cut costs of production, insure profits and preserve the wage level.

Some sizable PWA orders already are being placed and are being prepared in growing volume. Other large Government orders, which involve sizable steel requirements, also are being placed, notably those for naval and merchant ships and machinery for them as well as for other requirements necessary for the larger military establishment that the United States is rushing as a protection against spread to this country of war conditions whose development abroad has occasioned concern, other important sources being relied upon to stimulate industry on the Government housing and slum clearance programs.

Administration sources think that price cuts in steel will be a big factor in building up demand over and above Government requirements and find

comfort in the slight upturn that has set in, some of the improvement having come prior to the price slashes. On this basis they affect the belief that wage cuts will not be necessary. Though often at loggerheads with the steel industry, Washington today at least on two points is in the unusual position of metaphorically patting the industry on the back. One smile of approval is for the cut in prices. The Administration previously and frequently attacked the industry for maintaining so-called rigid and high prices. The other smile is for the steel industry's plan to maintain wages during a test period. Should the hoped-for upturn in business develop, the market become stabilized and sufficient profits come to justify the present level, wages will not be cut.

That would be most gratifying to the President. He made this known when, overstepping himself in his fireside chat, he expressed pleasure that steel price cuts would not involve wage reductions. Denial was made by United States Steel Corp. officials that assurance had been given the President that wage cuts would not be made. At the same time the Administration is convinced the steel industry clearly is not going to slash wages until a fair test has been given of the new price schedule and the resulting market.

On the other hand, even Government officials, as well as labor, realize that unless markets and profits are forthcoming soon the price cuts will compel the reduction of wages.

In this connection the circumspect and brief comment on the steel wage situation by CIO members is held to indicate that they are fully aware of the implications of price cuts unless followed by upturn of profitable markets.

John L. Lewis has contented himself with the statement that "The CIO stands with President Roosevelt in opposition to wage cuts in industry." He would not further elaborate on the wage situation in steel. Mr. Lewis and Philip Murray, head of SWOC, had opposed price cuts and at a White House conference some months ago made their attitude known to the



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President who was then urging steel price slashes.

Not only does organized labor realize the necessity of improvement in the steel industry, both as to markets and profits if wages are to be maintained, but it is likewise watching with interest developments growing out of the new pricing situation. It is aware it marks a wide departure from established practices and has so many ramifications that it will take considerable time fully to learn their significance.

Change in Steel Basing Points Stirs Interest in Monopoly Probe

WASHINGTON.—Interest was mounting this week in the joint executive-legislative anti-monopoly committee's scheduled scrutiny of the basing point system and the subject of price rigidity because of the sudden injection of the wide

departure in basing prices in the steel industry.

Members of the committee and Washington generally were represented as seeing far-reaching implications in the shift but, like the trade itself, preferred to speculate cautiously on the effects rather than to forecast direct results. There was a definite feeling in Government circles, however, that elimination of price differentials pointed in the direction of a substantial readjustment and relocation of markets, with Birmingham mills apparently being in a position to be considerably more competitive than heretofore with Northern and Eastern mills.

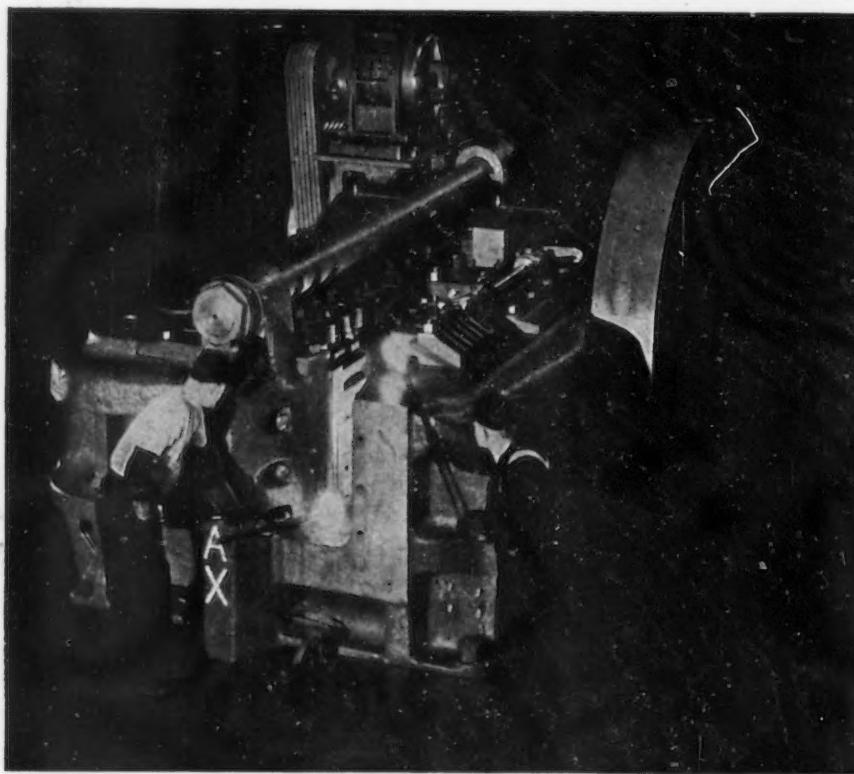
Because of the price developments in the steel industry, there was some speculation as to whether the move would take some of the thunder from committee members and so-called experts in Government agencies who have attacked steel prices repeatedly. Some Government officials who have pursued extensive studies of the steel industry have revised their views about substituting an f.o.b. mill basis of quoting prices for the old-established basing point system and now express doubt that such a change should be effected, certainly not abruptly.

They point to the fact that the trade has already begun to show some signs of concern over small steel companies with operations confined to one area and that fears have been expressed that such mills will be more restricted in their sales than heretofore, because of the recent change in quoting steel prices.

Steel Pricing Policy to Play an Important Part

There was no indication, however, that the Federal Trade Commission had abandoned its position on the subject—a position which it has repeatedly and conspicuously made known since 1921. Commissioner Garland Ferguson is the FTC representative on the committee, and there were some signs that the basing point question would be a cause of conflict within the committee itself with steel prices and the steel pricing policy scheduled to play an important part in the controversy.

While there was no evidence that the committee, as a whole, which met for the first time last Friday, had dis-



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cussed the recent elimination of price differentials, Washington officials who are studying the situation are attempting to learn if the new pricing policy will work toward restricting markets in the East for Pittsburgh mills and those located further west unless, of course, such mills are willing to accept rather sharply reduced net returns. Conversely, it appeared that the change had opened the Atlantic Seaboard markets more widely for Eastern producers, in the opinion of Washington officials.

Steel Men Opposed to Mill Basing at Hearing

The anti-monopoly committee's impending investigation of the basing point system, as a part of its assigned job, has directed attention in Washington to the Wheeler anti-basing point bill testimony presented during the public hearings on the Wheeler anti-basing point bill. During these hearings, Frank R. Frost, president of Superior Steel Corp., Carnegie, Pa., manufacturer of hot and cold-rolled strip steel and stainless strip steel, appeared before the Senate Interstate Commerce Committee on March 23, 1936, and strongly opposed passage of the bill.

"In the absence of any uniform system of arriving at costs in the steel industry," Mr. Frost testified, ". . . it would appear that the result of a bill such as has been proposed here would be disastrous to all small steel manufacturers having but one plant. They would find it very difficult to accommodate themselves overnight to a system of selling that would provide for a basing point at every mill; and the net result would be spirally lowered prices, lowered wages, and chaos in the industry."

He told the committee that under the multiple basing-point system it is difficult enough to determine "our competition exactly." To greatly increase these basing points, as he said the proposed f.o.b. mill system would do, would handicap small plants located outside of consuming markets and would force these mills to operate at a loss even in the face of a reasonable rate of operation, Mr. Frost declared.

"Therefore, please do not delude yourselves into thinking that the passage of this bill is in the interests of small steel manufacturers," he continued. "It is in the interest of no steel manufacturer, as far as that is concerned, but would harm the small one greater than the large one. And in the end, we believe it would be

harmful to the public, in that it would increase monopoly and be against the interests of a great number of consumers."

Speaking as president of the U. S. Steel Corp., William A. Irvin appeared before the committee on April 3, 1936, and in the course of his testimony in opposition to the Wheeler measure, said that the suggested change—from the basing point system to an f.o.b. mill basis—"would be least harmful to us of any in the industry, because

of our plant locations in the various parts of the country, and, in my opinion, in the long run it would be of benefit to the Steel Corporation."

Mr. Irvin went on to say he thought a very substantial evil would be shown immediately if the changes proposed by the bill were made effective.

"I think, as Senator Moore (representing New Jersey at that time) said, many of his people would be dislocated," Mr. Irvin continued. "I think many of the smaller steel plants would



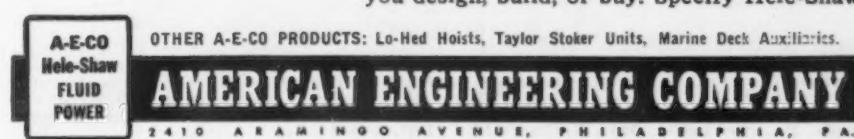
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find themselves dislocated because no one would know what the price was."

The Wheeler bill was never favorably reported out by the committee and the Senator from Montana apparently dropped all efforts in pushing the measure.

Monopoly Committee Holds Its Organizing Meeting

At the anti-monopoly committee's initial organizing meeting on Friday,

the group designated Representative Hatten Sumners, conservative Democrat of Texas, to be vice-chairman. It was the first meeting of the full committee. Edward C. Eicher, representative from Iowa, a staunch New Dealer, announced on Saturday that he had withdrawn from the Congressional race in his district to permit him to devote his full time to the preliminary work of the committee.

Some significance was attached to

the appointment of Leon Henderson, economic adviser to Works Progress Administrator Harry Hopkins and former director of the NRA Research and Planning division, as the secretary of the committee. Although Chairman O'Mahoney described Henderson's new duties as that of a "co-ordinator," it was generally believed that his job would go far beyond the scope indicated by that term, and that in reality his participation would amount to a full-fledged adviser to the committee. Henderson and Herman Oliphant, general counsel for the Treasury Department and also a member of the anti-monopoly committee, are generally credited with suggesting the new procedure of calling for Government cement bids on an f.o.b. mill basis. Henderson has frequently attacked steel prices and the steel pricing policy.

After a two-hour conference, Senator O'Mahoney outlined to newsmen the action taken at the meeting and emphasized that particular industries were not discussed during the initial session. The steel industry was not mentioned, he said, and neither was cement or oil. Later in the day, the Senator told *THE IRON AGE* that reports that representatives of the steel industry would be the first called before the committee were wholly speculative and that the committee had made no such plans. The exact date for beginning public hearings has not been determined, but is estimated by O'Mahoney to be around Sept. 1.

With Isadore Lubin, head of the Bureau of Labor Statistics at his side nodding assent, the Senator said that at the next meeting, scheduled for July 7, the various members of the executive departments will bring before the body an outline of specific subjects which they feel should be subjected to the committee's scrutiny. On the basis of these recommendations, the committee will determine the exact scope of its investigation and lay its plan on that basis. O'Mahoney promised that the group would swing into action immediately after that.

Committee Members Deny Discord

One step taken at last week's meeting was a move interpreted as designed to bring legislative and executive members into closer harmony. Members of the two groups, it was decided, are to be paired into groups of twos, but these pairs have not been designated. The announced purpose was to move toward "complete coordination" with the assurance that at

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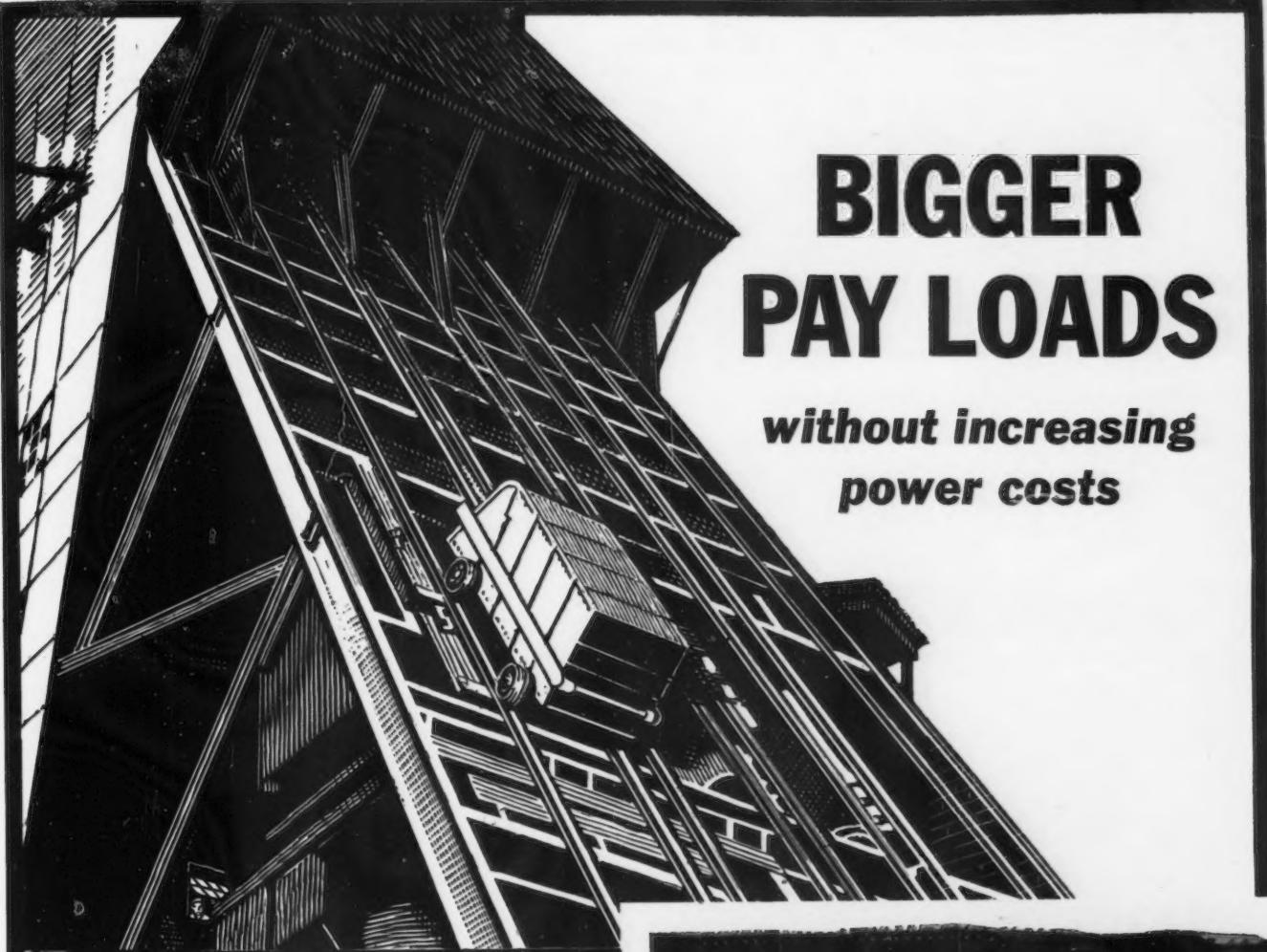
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least two members of the committee will be well versed in a particular subject or groups of subjects before the committee for consideration. These six groups would have power to subpoena witnesses and function as a unit if the committee so decided, although Senator O'Mahoney said the individual groups should not be considered as sub-committees.

He steadfastly denied there was any difference of opinion between members and minimized reports that the

committee was headed for an incongruous season ahead. While reports have been current for days that a natural division between the executive and legislative members, coupled with a somewhat wide difference of opinion on many economic issues, would make harmony difficult if not almost impossible within the committee, it appeared this week that differences between members of the Congressional group present further possibilities for conflict.

For example, Senator King, Democrat of Utah, is completely out of sympathy with the Borah-O'Mahoney Federal licensing bill, and is known to feel that the committee's work will constitute a natural build-up for their legislative proposal. King vigorously opposed the measure while it was pending in a Senate committee last session and can be expected to continue that opposition as a member of the anti-monopoly committee. There were other indications, too, that he and perhaps Representative Sumners would be stabilizers on the committee at least so far as the Congressional delegates were concerned.

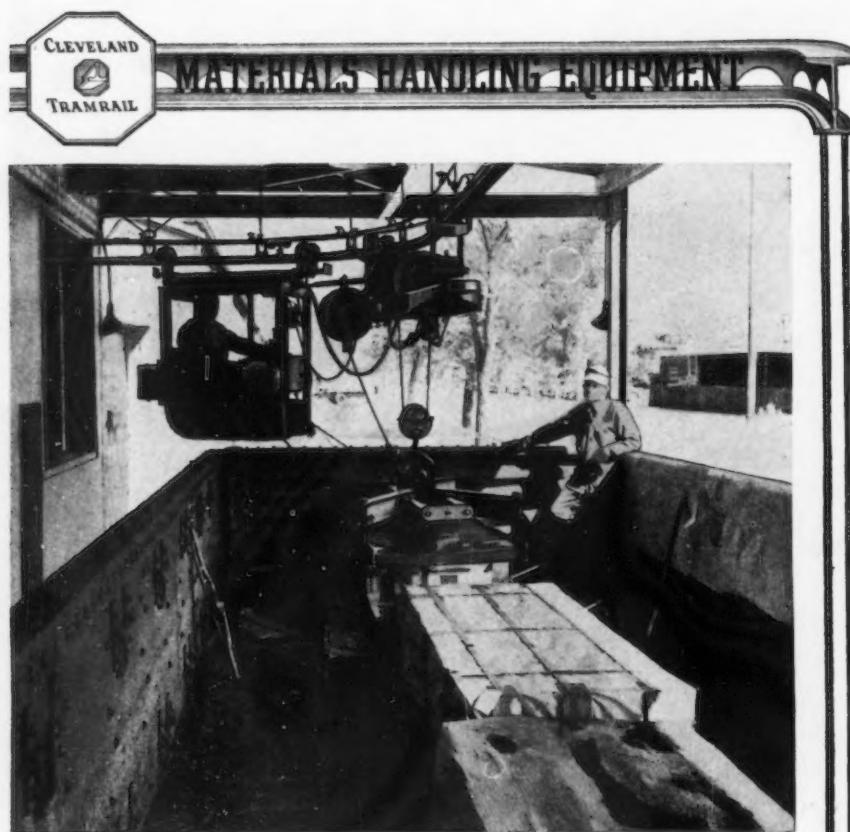
As Senator King Sees It

In sharp contrast to the views expressed by Thurman Arnold, head of the Justice Department's anti-trust division, and other executive department members of the committee, on what ought to be done about reforming the existing business structure Senator King takes this view:

"The development of industries in this country is very largely due to corporate development and has made us the most progressive and powerful country on earth." The Senator has vigorously opposed executive department participation on the committee.

Political Implications Seen

Other factors developing within the committee, however, are far from reassuring. Despite frequent statements from various members of the committee that there is no desire to turn the investigation into a "witch burning" fiasco, there still are definite indications that the inquiry will closely measure up to that description. A factor not to be overlooked is the power given the White House over the committee, with \$400,000 of the \$500,000 appropriated to be spent as directed by Mr. Roosevelt. Some committee members have expressed the view that the division of money allocated means little if anything, while others privately concede that the inquiry will move along the lines largely dictated by the White House with the big show timed for early fall just before the November elections. Significance also is seen in the political timing of the investigation. It synchronizes with the present Congressional campaign and under the resolution will end almost simultaneously with the Presidential campaign of 1940. So only by a performance to the contrary can the idea of witch hunting be dispelled by the Administration-controlled committee.



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Labor Board Issues Orders To Several Companies

WASHINGTON—The National Labor Relations Board has ordered the American Radiator Co., Litchfield, Ill., to disestablish the Litchfield Radiator Workers Association, and to bargain, on request, with the CIO's Amalgamated Association of Iron, Steel and Tin Workers. The board also has directed the Aluminum Products Co., La Grange and Lemont, Ill., to cease alleged unfair labor practices and disestablish the utensil makers organization as a representative of employees.

Labor organizations recognized by the NLRB during the week as exclusive collective bargaining groups together with the companies affected include:

The AFL's machinists union at the Blackstone Mfg. Co., Jamestown, N. Y.; the AFL's machinists union at Cutler-Hammer, Inc., Milwaukee, and the CIO's shipbuilding and marine workers union at the Pier Machine Works, Inc., Brooklyn.

U. S. Contracts Awarded for Dam Electrical Equipment

WASHINGTON.—The following contracts have been awarded for electrical equipment to be used in connection with Seminoe Dam of the Kendrick Federal reclamation project in Wyoming:

Four 10,000-kv. ampere transformers for the Seminoe power plant to the American Transformer Co., Newark, N. J., on its bid of \$174,090; four 5000-kv. ampere transformers for the Greeley substation to the Pacific Electric & Mfg. Corp., San Francisco, on its bid of \$67,600; four 2500-kv. ampere transformers for the Cheyenne substation to the Memco Engineering & Mfg. Co., Long Island, N. Y., on its bid of \$24,460.

South Africa Good Market For Industrial Machinery

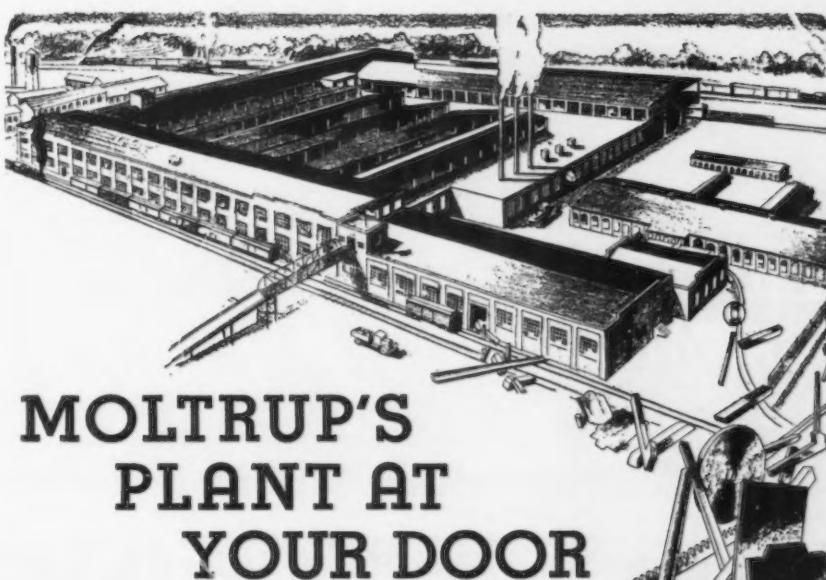
WASHINGTON—Imports of industrial machinery into the Union of South Africa during 1937 were valued at approximately \$17,750,000, a gain of 17 per cent over 1936 imports, according to a report to the Department of Commerce. Imports during 1937, however, were considerably below those during 1935, the peak year, valued at approximately \$31,785,000.

The United Kingdom, the United

States, and Germany, in the order named, are the chief suppliers of industrial machinery to the South African market. American participation is particularly strong in tractors and parts, factory plant, and miscellaneous items for mining and industrial purposes. During 1937 increases were noted in imports of American-made air compressors, boilers, cranes, shears and elevating machinery, engines of all types, lathes, pumps, woodworking and miscellaneous items. The depart-

ment said that United States participation could be materially increased by proper representation of interested American firms and individuals in that country.

Jones & Laughlin Steel Corp., Pittsburgh, announces that, effective July 1, the Roehm & Davison warehouse, at 3289 Beaufait Avenue, Detroit, will be known as the Detroit warehouse of the Jones & Laughlin Steel Corp. Purchased by the corporation several years ago, this warehouse is the distributing center for J & L products in the Michigan area.

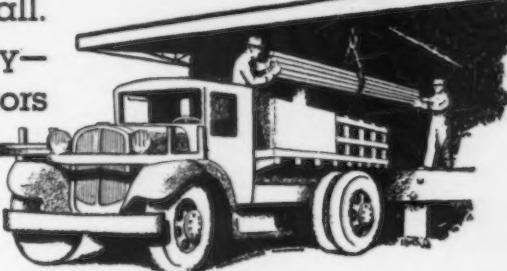


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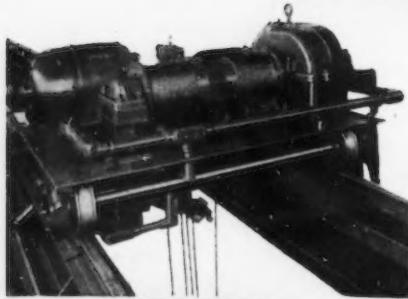
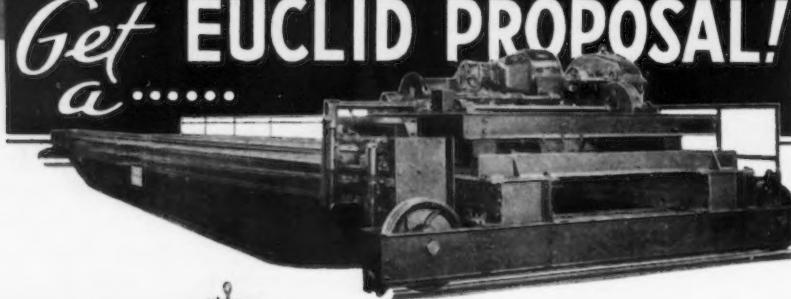
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CRANES
&
HOISTS

EUCLID Engineers have a background of 30 years' specialized experience building cranes and hoists.

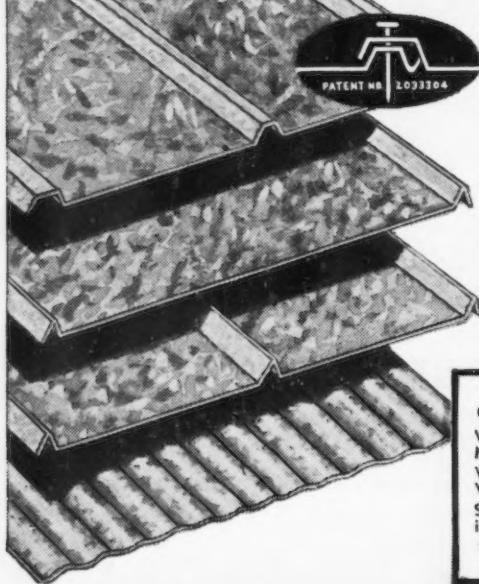
They are thoroughly familiar not only with the requirements of design and construction of such equipment but with their proper application to assure the lowest handling costs.

This knowledge is available without cost or obligation. Write us.

Note the clean-cut, sturdy design in the illustration. No complicated, fragile parts in Euclid equipment. Let us quote on your next crane or hoist.

THE EUCLID CRANE & HOIST CO.
1361 CHARDON RD. **EUCLID, OHIO**

STEEL ROOFING



Every application of steel roofing and siding is covered in Continental's 14 styles. The new "Tyl-Lyke" with its wide rib design combines a new style in steel roofing with a new patented lap. All styles, in wide variety of lengths and gauges, are made from special analysis (or .20% minimum copper-bearing) basic open hearth steel, galvanized by the SUPERIOR PROCESS. Ridge roll and other accessories are furnished for all styles.

CONTINENTAL STEEL CORP.

General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis

OPEN HEARTH STEEL

Wire: Bright Basic, Annealed, *Konik, Special Manufacturers, Galvanized, *Flame-Sealed.

Wire Rods, Nails, Staples, Bale Ties, Barbed Wire, Fence—15 Types; Gates and Fittings.

Sheets: Black, Galvanized, Special Coated; Roofing and Siding—14 Styles.

*Trade Mark Reg. U. S. Pat. Office.

CONTINENTAL
SHEET STEEL AND WIRE PRODUCTS

... PERSON

CALVIN VERITY, since 1933 executive vice-president and assistant general manager of the American Rolling Mill Co., Middletown, Ohio, has been elected general manager, retaining the executive vice-presidency. W. W. SEBALD, vice-president, succeeds Mr. Verity as assistant general manager. Mr. Verity first started to work for the company as a high school boy during vacations. On graduating from



CALVIN VERITY



W. W. SEBALD

SONALS . . .

Cornell University, he joined the company and has been continuously identified with it in various operating and executive capacities. Mr. Sebald joined the company in 1906 as an office boy and early in his career became identified with the sales end of the business. He was made manager of the New York sales office of the company in 1912 and assistant general manager of sales in 1919. He was later promoted to the assistant vice-presidency, and in 1926 became vice-president.

❖ ❖ ❖

C. M. KUHNS has been appointed sales manager of the Cleveland district of the Otis Steel Co. Mr. Kuhns served in the U. S. Air Corps from January, 1918, to June, 1919, and be-



C. M. KUHNS

came associated with the steel industry immediately following his discharge. He started in the warehouse division of Illinois Steel Co., Chicago, and was later transferred to the Milwaukee division, where he remained until 1924 when he joined the Gibbs Steel Co. In 1931 he left the Gibbs company to become associated with Youngstown Sheet & Tube Co.'s Milwaukee office. He traveled throughout the Milwaukee district until 1935 when he became affiliated with Otis Steel Co. as Milwaukee district sales manager. He was transferred to Cleveland early in 1938 so that he

IN YOUR INDUSTRY

Roller Chain drives give uninterrupted operation with less attention, therefore minimum expense, plus maximum production and profits

BALDWIN-DUCKWORTH CHAIN CORPORATION

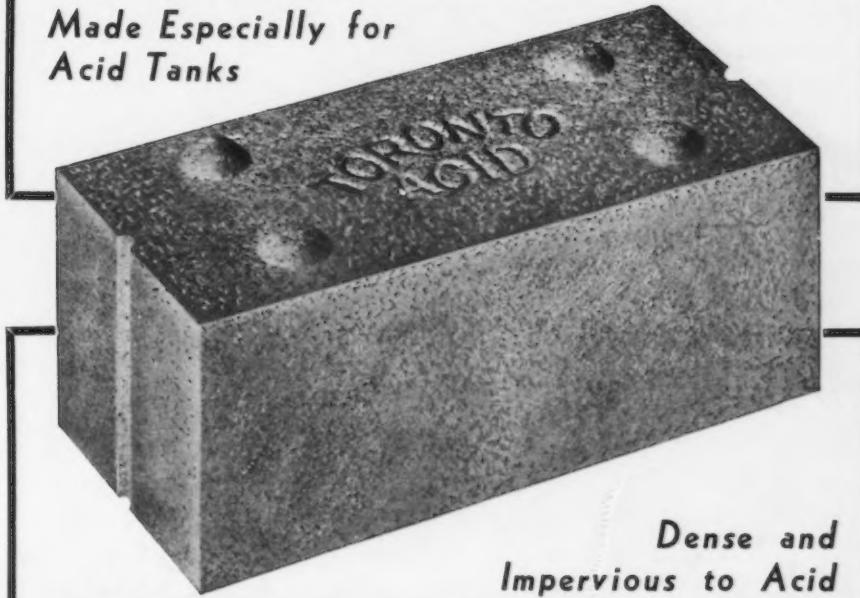
SPRINGFIELD and WORCESTER, MASS.

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TORONTO ACID BRICK

Made Especially for
Acid Tanks



Dense and

Impervious to Acid

FOR USE WITH BASOLIT CEMENT

Toronto Acid Brick are designed for use with Basolit, the acid-proof cement joint. Accurate spacing buttons and end grooves insure uniform self-anchoring joints at low labor costs for laying up tank walls and

floors. Precisely moulded, repressed and deaerated, Toronto Acid Brick are made in stock and special shapes. Send for samples and further information.

THE KEAGLER BRICK COMPANY
STEUBENVILLE, OHIO

Fire Clay, Acid Resistant Brick, Fire Clay Mill Brick, Pickling Tank Linings, Acid Proof Construction, Paving Brick, Paving Block, Chimney Stack Brick.

might become more familiar with facilities of the Otis plant.

♦ ♦ ♦

K. L. GRIFFITH, formerly manager of sales, sheet and strip division, Bethlehem Steel Co., has been appointed assistant general manager of sales. D. C. Roscoe, who has been manager of sales, pipe and tube division, succeeds Mr. Griffith as manager of sales of the sheet and strip division. A. T. Hunt will assist Mr.

Roscoe as manager of galvanized sheets and formed sheet products. E. A. BUXTON, formerly manager of sales, tool steel and small tools division, succeeds Mr. Roscoe, and D. A. ST. CLAIR, of the tool steel and small tools division, has been named manager of sales of that division.

Mr. Griffith became associated with the Bethlehem Steel Co. in 1932 at the time of the acquisition of the Seneca Iron & Steel Co., of which he had been president and general manager. Pre-

vious to his connection with the Seneca company, Mr. Griffith had been in the employ of the Carnegie Steel Co. He was graduated from Western Reserve University in 1916.

Mr. Roscoe has been with Bethlehem since his graduation from the

TRIPLES SPACE

With this Baker Fork Truck a large nail mill actually tripled its available storage space. Yet not a foot of floor space was added.

If space is a problem in your plant, consult with the Baker Materials Handling Engineer. His broad experience, authentic records cover savings in many types of industry. You will find his data helpful in determining the savings possible in your own plant. Write today.



BAKER INDUSTRIAL TRUCK DIVISION OF
THE BAKER-RAULANG CO.
2175 WEST 25TH STREET • CLEVELAND, OHIO



K. L. GRIFFITH



D. C. ROSCOE

University of Wisconsin in 1925. He started in the metallurgical department, then became assistant chief inspector of the tool steel department and later was transferred to the sales department, becoming manager of



A. T. HUNT



E. A. BUXTON



D. A. ST. CLAIR

sales of the tool steel division in 1928. In 1934 he was appointed manager of sales, pipe and tubes division.

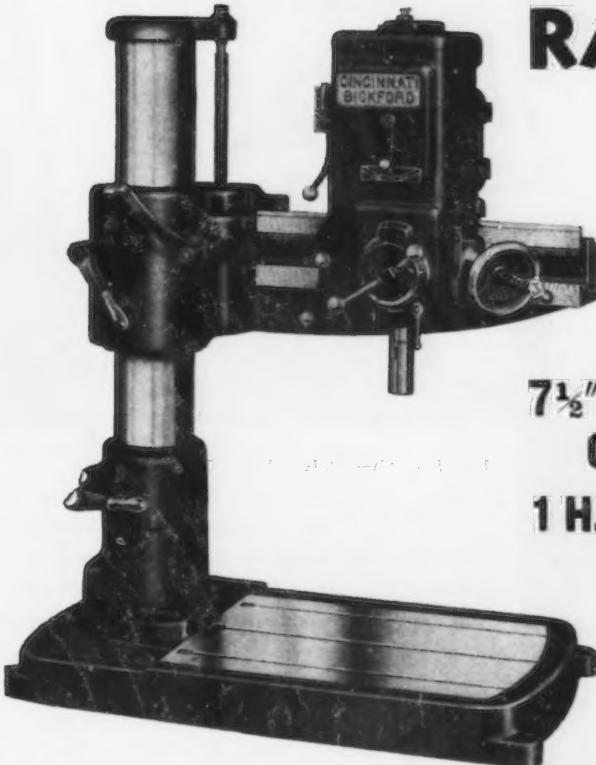
Mr. Hunt entered the employ of the Seneca Iron & Steel Co. in 1915, and was promoted to manager of sales in 1919. He was later manager of sales for Eastern Rolling Mills Co., Baltimore, and became connected with Bethlehem in the sheet and strip division of the sales department two years ago.

Entering Bethlehem's employ upon his return from service in the World War, Mr. Buxton became successive-

ly general foreman of the forge division, assistant superintendent of tool steel manufacture, chief of tool steel contact, and chief of alloy steel contact. He was appointed manager of sales, tool steel and small tools division, in 1934. He is a graduate of Lehigh University, class of 1917.

Mr. St. Clair entered the service of Bethlehem upon his graduation from Virginia Polytechnic Institute, in 1925. After several years in the metallurgical department, he was transferred to the sales department, serving in the tool steel and small tools divi-

NEW $2\frac{1}{2}$ ' SUPER-SERVICE RADIAL



**7 1/2" DIAMETER
COLUMN
1 H.P. MOTOR**

A NEW Radial Drill for production drilling of small holes. Economically replaces large upright drills or belt driven sensitive radials.

FEATURES—

Simplified Head—Pick-off gears—Automatic oiling — Anti-friction bearings — Multiple splined integral key shafts — Head mounted on ball bearing rollers and hardened steel armway — Single lever controls 3 power feeds by means of sliding chrome nickel steel gears — 3 or 6 spindle speeds.

This new Super-Service Radial will pull a 1" drill in cast iron, or a 3/4" drill in steel.

Write for full particulars and advantages of power and floor space requirements, size, economy and ease of handling. Ask for Bulletin R-26.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

sion, of which he has now been appointed manager of sales.

♦ ♦ ♦

A. L. PETERSEN, who has been associated with Joseph T. Ryerson & Son, Inc., Chicago, for 25 years, has been made manager of the company's St. Louis plant, where he has been assistant manager for some time. Mr. Petersen has been active in a sales capacity with the company in the Chicago, Detroit and New York offices.

R. B. WILSON will continue his association with the company as special sales representative.

♦ ♦ ♦

HERBERT M. COOLEY, formerly field engineer for the National Tube Co., Pittsburgh, has become connected with the Bethlehem Steel Co., Bethlehem, Pa., as manager, field engineering, tubular products division, with headquarters in Tulsa, Okla. He will be identified with the Bethlehem Supply

Corp., of which G. A. THOMPSON is vice-president. Mr. Cooley is a graduate of the Carnegie Institute of Technology.

♦ ♦ ♦

ARTHUR R. ALLARD, heretofore works manager of the South Philadelphia plant of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been elected vice-president in charge of manufacturing of the General Steel Castings Corp., Eddystone, Pa. He has been identified with the Westinghouse company for 22 years.

♦ ♦ ♦

GEORGE P. WARDLEY, who was recently appointed assistant director of

Thomas
COLD ROLLED
STRIP STEEL

ELECTRO ZINC COATED
ELECTRO COPPER COATED
ELECTRO NICKEL COATED
ELECTRO BRASS COATED
BRIGHT FINISH UNCOATED



WHEN Thomas cold rolled strip is on the job, you can depend on uniformity of gauge, temper and finish. You can resume speed and maintain it constantly, uninterrupted by steel failure. Thomas strip is available in uncoated bright finish and also electro-coated with copper, brass, zinc and nickel. All these give Thomas a greater range with which to match cold rolled strip to the job—it is truly a steel rolled by specialists. For further information, write or call The Thomas Steel Company.

THE THOMAS STEEL CO. . Warren, O.

Specialized Producers of Cold Rolled Strip Steel



A. L. PETERSEN

industrial relations, Carnegie-Illinois Steel Corp., was honored last week at a testimonial banquet at the Sherry Hotel, Chicago. The banquet was arranged by a committee representing South works where Mr. Wardley has previously served as superintendent of industrial relations and about 200 attended.

B. M. LIVEZEEY, general superintendent of South works, was toastmaster. Tribute was paid Mr. Wardley by W. E. HADLEY, manager of operations, Chicago district, E. E. MOORE, general superintendent, Gary works, J. M. Darbaker, general superintendent, Gary sheet and tin mills, and H. A. STRAIN, assistant general superintendent, South works.

F. R. KOHNSTAMM has been appointed manager of Westinghouse Electric & Mfg. Co.'s newly created agency sales department at Cleveland. He will continue his present duties as manager of the lighting division also located in Cleveland. The new department will direct and develop sales policies, market outlets, advertising and promotion of all apparatus under its jurisdiction, sold through distributorships and similar sales agencies. Mr. Kohnstamm has been associated with Westinghouse since 1917 and has been in Cleveland since 1934 as manager of the lighting division.

♦ ♦ ♦

WARREN W. KELLY has been appointed general purchasing agent of



H. M. COOLEY

the Santa Fe System Lines, succeeding the late JOHN J. CONN. Prior to his appointment as general purchasing agent, Mr. Kelly was chief engineer of the Western Lines of the Santa Fe at Amarillo, Tex. Born in 1885, he was educated at Washburn Academy, Topeka, Kan., and at the Rose Polytechnic Institute, from which he received the degree of Bachelor of Science in Civil Engineering in 1907. Mr. Kelly first worked for the Santa Fe as chainman in the summers of 1903 and 1906. He has been continuously in Santa Fe service since September, 1907, advancing successively in various positions in the en-

gineering department until his appointment as chief engineer of the Western Lines at Amarillo in September, 1929.

♦ ♦ ♦

HARRY E. MILLER, consulting manufacturing engineer and former manager of the Newark, N. J., meter works of the Westinghouse Electric & Mfg. Co., has retired after an association of 49 years with the company. He has occupied executive positions

at the Newark works for the last 38 years.

♦ ♦ ♦

PATRICK CALHOUN, JR., of Cincinnati, has been elected a director of American Fork & Hoe Co., Cleveland.

♦ ♦ ♦

H. D. RHODEHOUSE, general traffic manager, Republic Steel Corp., Cleveland, has announced the appointment

(CONTINUED ON PAGE 84A)



WE LIKE THE TOUGH ONES

When it comes to problems of metal cleaning, we like them tough. Most of the routine operations are an old story to us. We—and hundreds of users—know that Wyandotte Metal Cleaners will do them quickly and economically.

What we like best is a cleaning problem that we can get our teeth into—something that has the best men in your plant worried. We like the fun of working

it out on the spot—and licking it.

Whether your cleaning problems are unique or run-of-the-mill, we'd like to send a Wyandotte Service Representative to talk to you. The chances are that he can suggest ways of simplifying some jobs, and we know he can show you how to do them better and more economically—with Wyandotte Metal Cleaners.



THE NEWS IN BRIEF.

Official Washington, though opposed to wage reductions, admits possibility of downward readjustment of labor costs. Page 58.

Change in basing point system in steel industry increases interest in forthcoming anti-monopoly investigation by executive-legislative committee. Page 84D.

Basing point changes may alter the industrial map of the United States, steel trade believes. Page 84D.

Cut in steel and pig iron price not expected to affect machine tool prices. Page 105.

Labor conditions being more settled, present assemblies continuing upward and indications of a good production volume of 1939 models all tend for a more cheerful attitude in the Detroit district.—Page 54.

NLRB has ordered the American Radiator Co. and other companies to disestablish workers' associations and bargain with the CIO and list other exclusive collective bargaining groups.—Page 65.

Electrical contracts for Seminoe power plant are awarded by the Government amounting to \$266,000.—Page 65.

Imports of industrial machinery into the Union of South Africa showed a gain of 17 per cent in 1937 over 1936.—Page 65.

Impact Testing Symposium features A.S.T.M. Annual Convention.—Page 73.

New law protects pickets and rights to organize, prohibits strikebreakers crossing state lines.—Page 84H.

American Society for Testing Materials elects new officers.—Page 73.

Pennsylvania State Supreme Court declares 44-hr. week law unconstitutional.—Page 82.

Sales promotion engineers see big future for factory built steel houses.—Page 82.

Large stamping press installed at Milwaukee.—Page 82.

Bank of England assisting Richard Thomas & Co. to raise £6,000,000 to finance completion of plant.—Page 83.

PWA to spend \$244,700,000 for steel and cast iron pipe.—Page 83.

Senator Burke calls for new labor act.—Page 83.

Payrolls of the steel industry in May amounted to \$46,757,000, about \$1,000,000 less than April.—Page 84.

Prizes are awarded for most beautiful bridges; the Golden Gate bridge is chosen as the masterpiece.—Page 84A.

U. S. Navy awards 10 auxiliary ships and six submarines; the 10 auxiliary ships require 7650 tons of steel.—Page 84B.

Blaw-Knox Co. ahead of schedule in largest piping installation for Carnegie-Illinois Steel Corp.—Page 84B.

Army orders 276 aircraft engines and 98 planes.—Page 84H.

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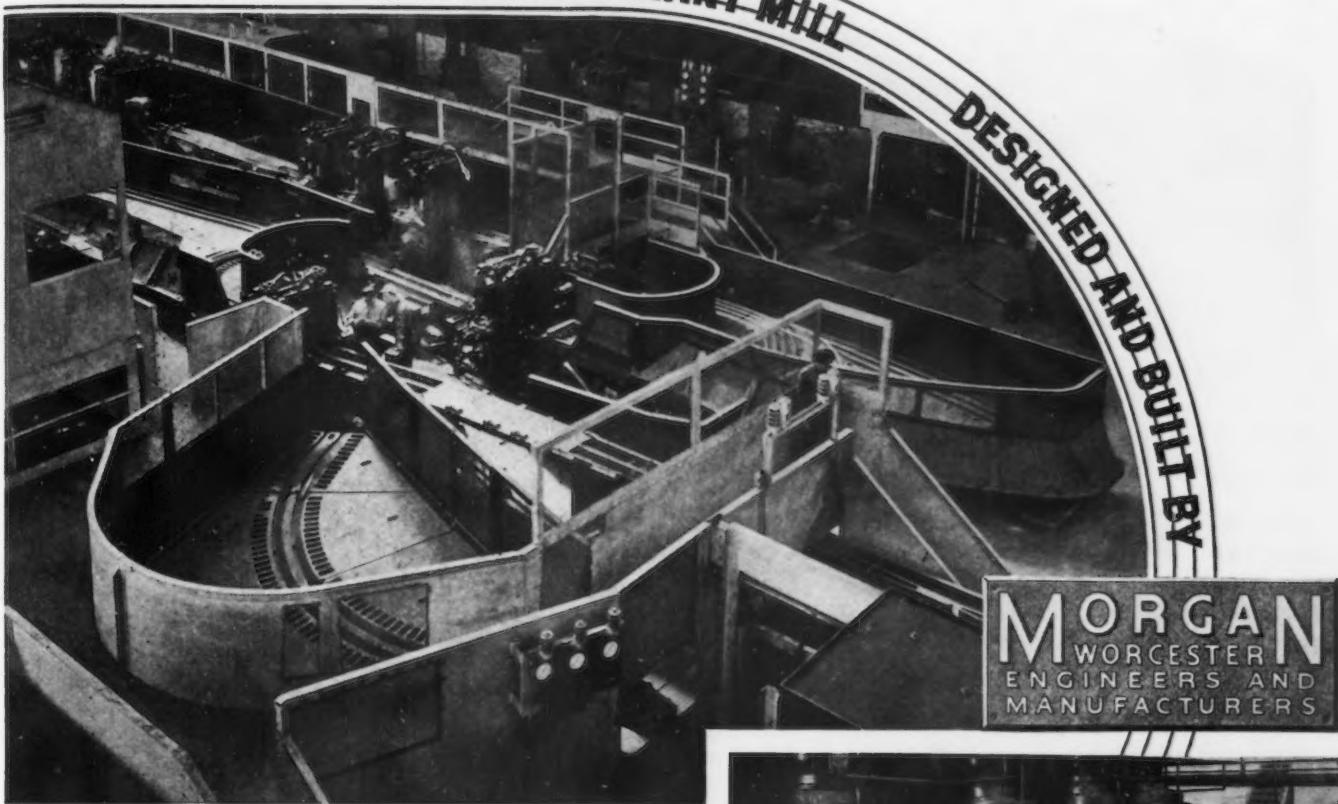
CONVENTIONS

Sept. 26 to 30—Association of Iron and Steel Engineers, Cleveland.
Oct. 10 to 14—American Institute of Steel Construction, French Lick Springs, Ind.
Oct. 12 to 15—The Electrochemical Society, Rochester, N. Y.
Oct. 13 to 15—Society of Automotive Engineers, aircraft production meeting, Los Angeles.
Oct. 17-21—National Metals Congress, Detroit.
Oct. 31 to Nov. 2—National Foreign Trade Council, New York.

CONTINUOUS ROD AND MERCHANT MILL

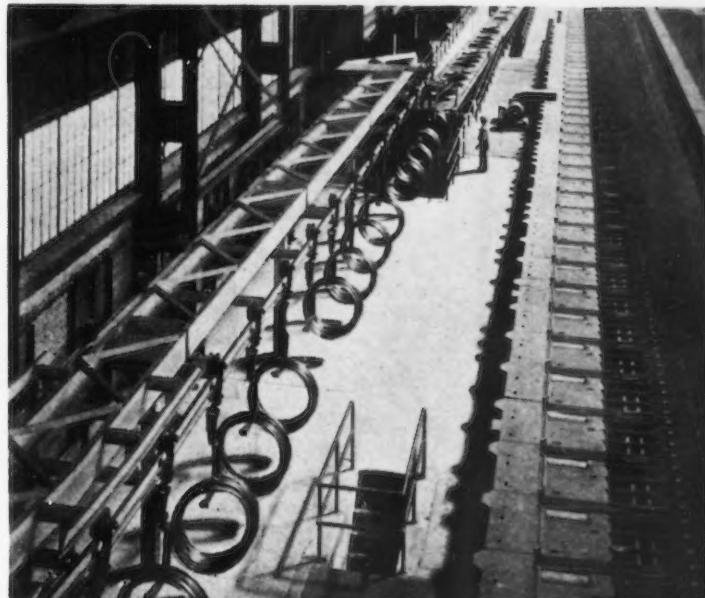
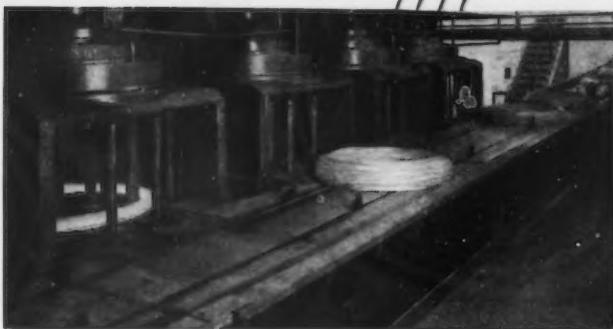
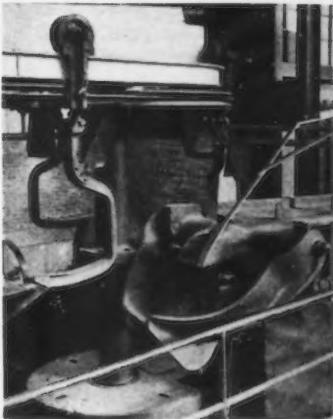
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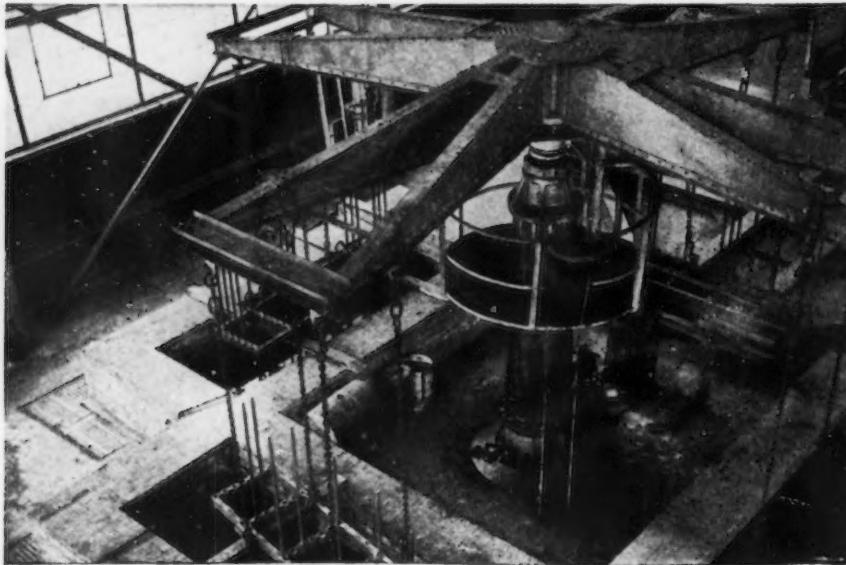
MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS



These photographs of a new Morgan Continuous Mill show Looping Stands and Repeater feeding a Rod Finishing Train; the Rod Laying Reels, chain Coil Conveyor, automatic "Take-off," and Coil Hook Carrier. Morgan experience and attention to detail assure continuous production with maximum accuracy and minimum lost time.

R43





Three Section **BASOLIT PICKLING TANK**

recently installed with a Mesta Pickler in one of the large new sheet mills at Cleveland. Each tank is 20' long, 6' wide, 9' deep. Construction is brick-veneered concrete shell with inner lining of acid proof brick and acid proof jointing cement BASOLIT—also available in combination with rubber lined steel tanks.

The installation illustrated is one of the many hundreds where BASOLIT has contributed toward long life and efficient operation of modern pickling equipment.

NUKEM PRODUCTS CORPORATION,
New York • Pittsburgh • Detroit • Kitchener, Ont.

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BUFFALO, N. Y.

MARVEL

High-Speed-Edge HOLE SAWS

*For Portable Drills,
Drill Presses and Lathes*



MARVEL Hole Saws will not only out-cut and outlast ordinary hole saws in portable electric drills, but have the strength for drill press and lathe use, and the set for deep drilling to $1\frac{1}{8}$ " in steel.

They embody the patented MARVEL principle of a composite non-breakable saw—a genuine 18% Tungsten high speed steel cutting edge electrically welded to a chrome-vanadium body. This construction gives not only the fastest cutting, longest lasting edge available, but also a hole saw that can withstand the terrific peripheral speeds of small drill presses and portable drills. The arbors of MARVEL Hole Saws are proportionally heavier and have solid hexagonal shanks that fit both 2 or 3 jaw chucks. Pilots of genuine high speed steel.

*If your supply house cannot furnish
MARVEL High Speed Edge Hole Saws,
write for name of local jobber.*

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5749 BLOOMINGDALE AVE., CHICAGO, U. S. A.

Impact Test A.S.T.M.

ASSEMBLED in their 41st annual convention at Chalfonte-Haddon Hall, Atlantic City, N. J., approximately 900 members and guests of the American Society for Testing Materials last week waded through an ambitious program composed of almost 100 different items, ranging from "A Study of Deflocculating Agents Used in the Particle Size Determination of Soils," to "Symposium on Impact Testing," a program of such diversification as to



ROBERT H. HEYER

Recipient of the Charles B. Dudley Medal

be of interest at the same time to the metallurgist, physicist, chemist, highway engineer, plastics engineer, textile and rubber technicians.

With no technical sessions scheduled for Monday, June 27, that day was devoted to a variety of committee meetings to discuss existing standards and revamp tentative standards. The Tuesday sessions marked the official opening of the convention, and were featured by the annual president's address, this year being entitled "Organized Research," offered by Albert

Features 41st Convention

Easton White, retiring president of the A.S.T.M.

Mr. White pointed out that "previous to the beginning of the twentieth century a considerable amount of the research work in the world was done by individuals. These men carried forward their work, spurred on by an undying enthusiasm for their respective subjects. At the present time," according to Mr. White, "the major amount of industrial research in this country is done by corporations, this



T. G. DELBRIDGE
President of the A.S.T.M. for the
Ensuing Year

fact being so self-evident and so well recognized that it needs no support." Particularly stressed by Mr. White was that, "no matter how large or small a corporation, it must look forward to supporting research work if it expects to continue long in the field in which it is at present engaged. Whereas a large corporation can conduct its own research, it is usually inadvisable for the smaller corporation, at least at the start, to establish and maintain a research organization of its own.

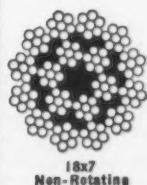
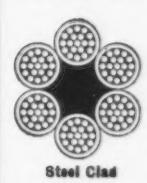
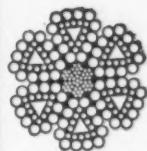
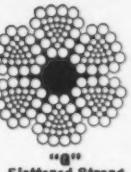
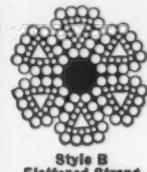
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at its peak —
It's a WELLS!*

**Now!
3 Speed
Control**

THE Wells Metal Cutting Band Saw is the ideal unit for all-around cutting jobs. It cuts metal speedily in any shape with extreme accuracy. You can use it to advantage in any part of your plant or shop because of its versatility. Send for a folder and really learn what a Wells Band Saw can do for you.

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WELLS MFG. CORP. Three Rivers, Michigan



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Non-Rotating

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Non-Rotating

You Can Depend On "HERCULES"*(Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close co-operation with users.

—PREFORMED—

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions.

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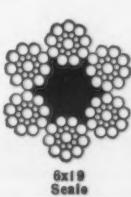
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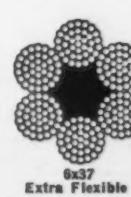
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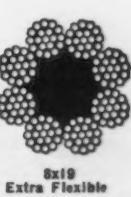
8x8
Filler Wire



8x8
Scale



8x7
Extra Flexible



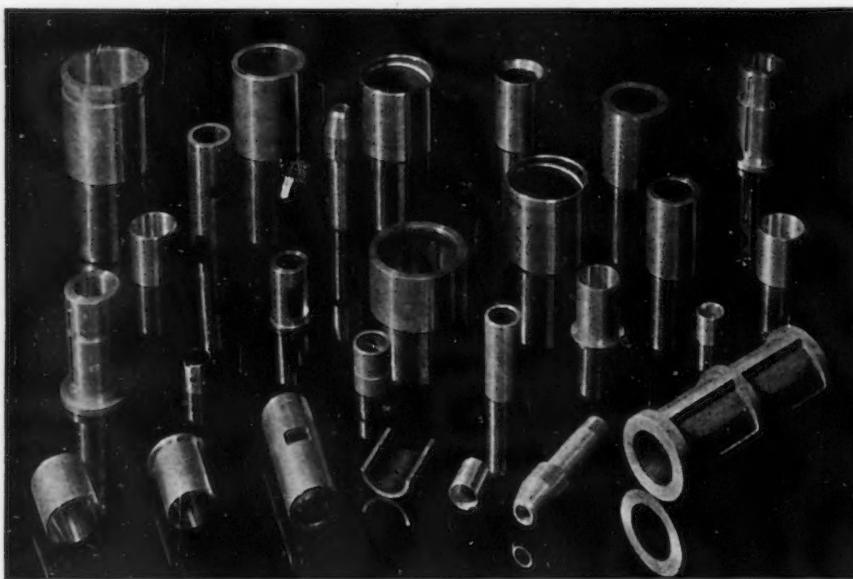
8x8
Extra Flexible

There is no need to do so, for there are at present plenty of well organized facilities and personnel available to which they can take their problems."

Following Mr. White's address, the remainder of Tuesday morning's session was devoted to the awarding of honorary memberships and the introduction of newly elected officers. The three new honorary members are Frank O. Clements, technical director of the research laboratories, General

Motors Corp., Detroit; William K. Hatt, research professor, Purdue University, Lafayette, Ind.; and Herbert F. Moore, professor of engineering materials, University of Illinois, Urbana, Ill.

Elected to fill the president's chair during the coming year was T. G. Delbridge, manager of the research and development department of Atlantic Refining Co., Philadelphia. Mr. Delbridge obtained his Ph.D. from Cornell in 1907, thereafter remaining as



Cost so Little Mean so Much

IN comparison, the cost of the bearings is perhaps the smallest item in your product . . . yet no other one part carries such a responsibility in the final performance of the machine. Consequently, it's both common sense and economy to insist on the highest quality bearings possible.

Regardless of what your sleeve type bearing requirements might be, we can fill them. Our complete facilities enable us to deliver **EVERY TYPE** in any quantity. For more than 25 years Johnson has set the pace for quality. Let us quote on your next order.

JOHNSON BRONZE
505 S. MILL STREET • NEW CASTLE, PA.

Sleeve BEARING HEADQUARTERS

instructor until 1909, after which he went to the Atlantic Refining Co. to rise progressively to manager of research and development in 1922. Elected for a two-year term as vice-president was W. M. Barr, chief chemical and metallurgical engineer of the Union Pacific Railroad Co., Omaha. A graduate of University of Iowa, Grinnell College and University of Pennsylvania, Dr. Barr entered the employ of Union Pacific Railroad Co. in 1916, to subsequently become chief chemical and metallurgical engineer, in which position he has charge of laboratories, water supply, inspection and tests and specifications of materials.

As new members of the executive committee, elected for terms of two



W. M. BARR

Vice-President for the Ensuing Year

years, are A. T. Goldbeck, engineering director of the National Crushed Stone Association, Washington; Dean Harvey, materials engineer of Westinghouse Electric & Mfg. Co., East Pittsburgh; G. E. Hopkins, technical director of Bigelow-Sanford Carpet Co., Inc., Thompsonville, Conn.; Allen Rogers, supervisor of industrial chemical engineering, Pratt Institute, Brooklyn; and J. J. Shuman, inspection engineer of Jones & Laughlin Steel Corp., Pittsburgh. Mr. Shuman graduated in 1890 from Northwestern University and later worked in both the South Works and Joliet Works of Illinois Steel Co. Later he became

assistant general superintendent of Newburgh Steel Works, Cleveland, and in 1900 joined Jones & Laughlin Steel Corp.

The Dudley Medal, awarded each year to the author or authors of the paper presented at the preceding annual meeting which is of outstanding merit and constitutes an original contribution on research in engineering materials, this year was presented to Robert H. Heyer, junior metallurgist of American Rolling Mill Co., in recognition of his paper of last year entitled "Analysis of the Brinell Hardness Test."

Of primary interest to metallurgists and physicists attending the meeting

for generations. Whether the impact blow is produced in an elaborate machine upon a carefully prepared specimen or by the crude method of wielding a hammer by hand upon an irregularly shaped rough-finished piece of material, the purpose of the test is the same: *to detect brittleness or relative toughness.*

According to Mr. Tour, "the technical literature contains numerous contributions on the subject of impact testing. In certain specific applica-

tions the 'art' has been advanced to a 'science.' The 'science' of impact testing has to do with the details of the test itself and the significance of numerous results of the test. The 'science' of impact testing promotes a careful study of the technique used in the test, a careful analysis of the testing conditions used, a standardization of the test specimens, a critical evaluation of the results. These are all very worth while."

Mr. Tour stated that his paper was



J. J. SHUMAN
New Member of the A.S.T.M.
Executive Committee

was the thirteenth Edgar Marburg Lecture entitled "The Torsion Test," presented by Dr. Albert Sauveur, metallurgical engineer and professor emeritus of Harvard University, at the Wednesday morning session. Otherwise, the metallurgist and physicist showed greatest enthusiasm for the symposium on impact testing.

Opening the symposium, Sam Tour, vice-president of Lucius Pitkin, Inc., dwelt at length on "Utility and Non-Standard Impact Testing." Mr. Tour pointed out that impact testing as a means for detecting the presence of brittleness or the comparative toughness of materials has been practised



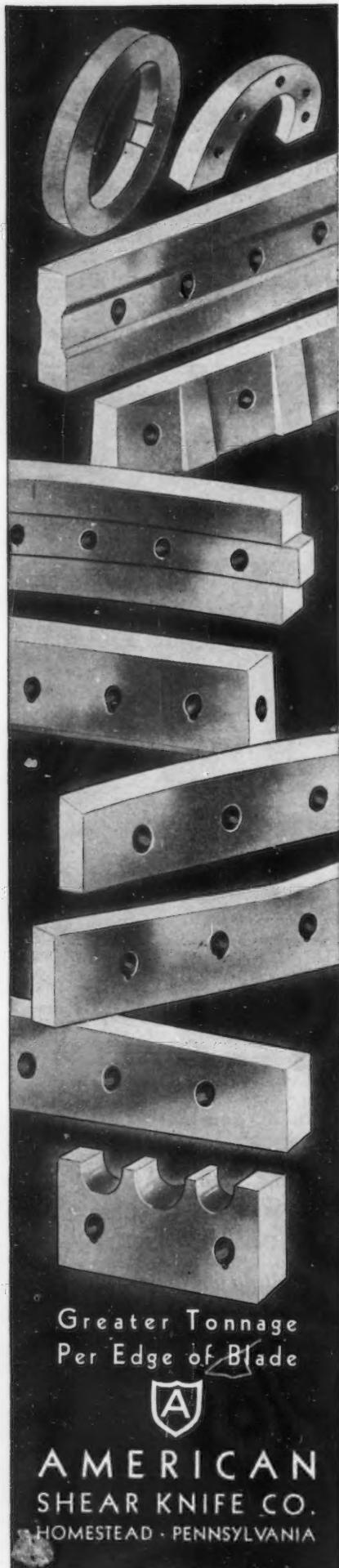
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78—THE IRON AGE, July 7, 1938

not presented as an argument against the "science" of impact testing, but rather "presented for the sole purpose of emphasizing the importance of the 'art' of impact testing as applied in the form of utility tests of materials and structures. While 'science' indicates the need of a standardized machine, it should not attempt to exclude the use of non-standard specimens nor the use of non-standard machines. The 'art' must be sufficiently practical to permit of its being applied in industry where the presence or absence of excessive 'brittleness' is of vital importance. The 'science' is not bound by such a limitation.

"During the past 20 years, various attempts have been made to limit the applications of the impact test by indirection. Attempts have been made to prescribe specific sizes and shapes of test specimens, of notches, of striking velocities, of relationships of centers of percussion to centers of gravity, of shape of striking edges, or rigidity of support of machine and specimen, of units and terms used in recording of results. As applied to specific utilization cases, these attempts at standardization are all worth while. As applied to the gen-

eral 'art' of impact testing, they tend to stifle and retard advancement. Thousands of sizes and shapes of articles in daily use must have a minimum degree of toughness which can be found by impact tests even though the articles are not of such shape or size as to permit of being subjected to one of the so-called standard tests.

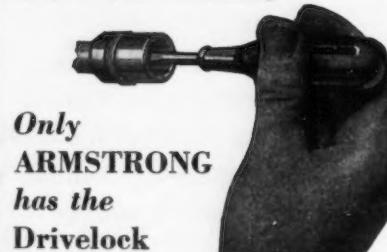
"While 'science' debates the stress distribution around notches of various sizes and shapes on test specimens, engineers and architects continue to design machines and structures subject to sudden loading and embodying all possible varieties of notches. The nature of the notch or notch effect is usually determined by unavoidable circumstances or details of the design. As the 'science' develops, the knowledge of the sequence of events which lead to failure at a notch is promoted. The actual failure as the climax of this sequence of events is the all-important point to the prospective user of the machine or structure. How can he be reasonably assured as to its safety? The answer may be found by comparison with successful machines or structures of similar design. Lacking such examples or not wishing to depend entirely on such examples, a service test may be made. Service

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tests, however, often involve many parts assembled into a finished machine or structure where the failure of one part causes damage to many other parts. Due to the excessive cost or great hazard involved in such cases, it is highly desirable to carry out tests on the individual items entering into the assembly. How are these tests to be made?

"Are they for the purpose of testing the quality of the material of which the part is made, or the quality of the finished part itself? The 'science' of impact testing leads to the belief that the energy absorbed per square inch of break is not a pure function of the area of the break even for similarly proportioned specimens of practically identical materials. The values obtained on a standard Charpy or Izod impact test specimen cannot be translated into design figures for a machine or structural part of different size and shape than the test specimen. The standard test tells something of the quality of the material from which the specimen was machined, but little as to the service characteristics of the part from which it was taken. Some test of the part itself becomes necessary. This test is in fact a utility test. If the part in use is subject to suddenly applied loads, the test involved should use suddenly applied loads. Such a test is a utility test in the field of the 'art' of impact testing.

"The part itself may not be such as to permit of being subjected as a whole to a utility test. Its size and shape may be such that only a portion of it is used for the test. If the portion so used is not in the shape of a fully machined or formed impact test specimen, a utility impact test again results. If the portion is fully machined or formed but is not to standard impact test specimen dimensions, the result is a non-standard impact test."

Mr. Tour's paper then went on to describe a number of examples of utility and non-standard impact tests which have proved of value in industry. Among these are the impact testing of fiber board, wood, concrete, stone, enamel, automobiles (i. e., an approximation by driving the car over Belgian block pavement), tire chains, small rollers, spring stock, gear teeth, cap screws, pipe and tubing, and rails.

Testing of Plastics

The next paper in this group was devoted to the "Impact Testing of Plastics," and was presented by Robert Burns and Walter W. Werring, of Bell Telephone Laboratories, Inc., and excellently illustrated with motion pictures. These men reaffirmed



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the excellence of the Izod and Charpy tests using notched bars for obtaining data on molded phenol plastics, but showed conclusively that no single testing method should be expected to suffice for all types of plastics. Rather, a group of three tests were suggested and evidence presented to show that a material proved to be strong by these three tests, when properly molded, will invariably produce a strong product. The data presented by the authors also made manifest

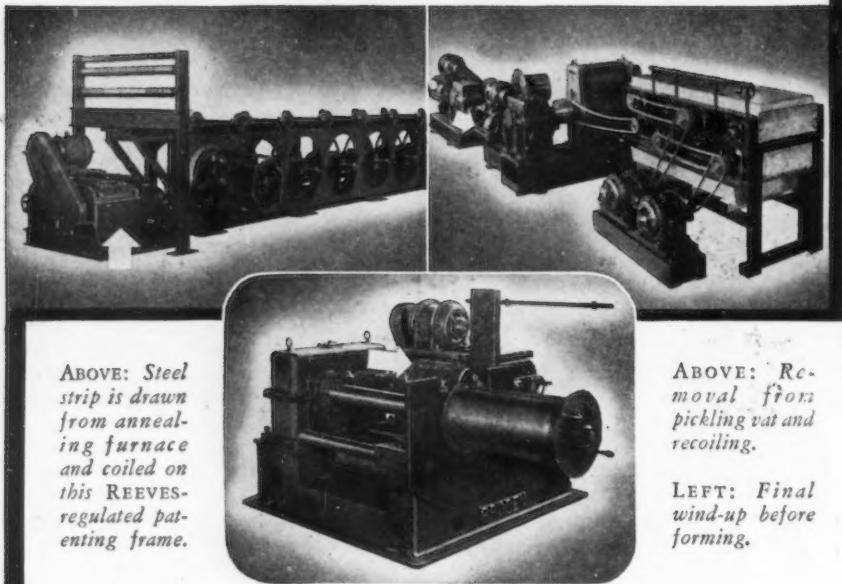
that a properly molded product, that is one that truly develops the strength properties of the raw material, is the *sine qua non* of plastics testing.

The third paper in the symposium on impact testing had as authors G. C. Riegel and F. F. Vaughn, of Caterpillar Tractor Co., and dealt with the "Practical Application of the Notched-Bar Impact Test."

The authors pointed out that for many years their company has accorded the notched-bar test a ranking

position among the various mechanical tests relied upon for assurance of fulfillment of the physical properties required in the vital parts of machines such as are produced by the Caterpillar Tractor Co. According to the authors, "it is felt that the service performance of the products over the same period of years has justified and substantiated the company's faith in the ability of the notched-bar impact test to discriminate between materials of satisfactory and unsatisfactory 'notch sensitivity.' Furthermore, such discrimination could *not* have been accomplished through the medi-

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ABOVE: Steel strip is drawn from annealing furnace and coiled on this REEVES-regulated patenting frame.

ABOVE: Removal from pickling vat and recoiling.

LEFT: Final wind-up before forming.

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DR. ALBERT SAUVEUR
Thirteenth Edgar Marburg Lecturer

um of the usual methods of static tests which were made in conjunction with the notched-bar impact test."

In the experience of the Caterpillar Tractor Co., the utility of the notched-bar impact test lies in its ability to detect and evaluate the effects of many factors upon which the quality and reliability of steel and iron products depend: namely, (I) relative metal quality aside from that associated with dynamic loads, (II) reliability of the quality of heat treatment, and (III) relative sensitivity to cleavage under conditions of suddenly applied stresses, or frequent overloading by gradually applied stresses.

After reviewing relative metal quality, reliability of quality of heat treatment, relative sensitivity to cleavage,

and effect of surface conditions, the authors concluded that, "(1) the notched-bar impact test is useful in evaluating the quality of ferrous metals, even though the material is not called upon to resist impact stresses in service; (2) the notched-bar impact test is a most discriminating proof of the quality of heat treatment of ferrous metals; and (3) the notched-bar impact test predicts the behavior of ferrous metals under conditions which produce brittle cleavage.

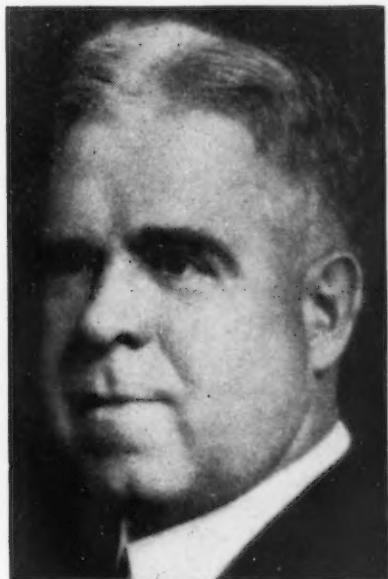
The next subject for discussion was a paper, "Use of Charpy Test as a Method of Evaluating Toughness Ad-

adjacent to the single-bead welds.

Keyhole-notch Charpy impact tests on the bars of "weld-quenched" material were compared with impact tests made on the parent steels in the "as-received" condition. The comparison indicates that when the chemistry of steel for welding is suitably chosen, there is little or no loss in toughness adjacent to the weld. For such steels the rate of transformation of the austenite is sufficiently rapid to form high-temperature products. Where

steels were encountered which were sensitive to the welding quench, a low value of toughness was obtained, coupled with a delayed or low rate of transformation of austenite.

Preheating tests made on a series of the steels sensitive to the welding quench indicated that in general the transformation of austenite can be shifted to higher temperatures by preheating, with the result that soft high-temperature products are obtained in the microstructure. The determina-



A. E. WHITE

Retiring President of the A.S.T.M.

adjacent to Welds," prepared by Walter H. Bruckner, of the University of Illinois. In this elaborate research report, Mr. Bruckner described how a series of steels with varied chemical contents were welded with a single welding bead placed on the surface of $\frac{1}{2}$ -in. thick flat plates of the steels. The heat-disturbed area adjacent to the weld deposit was surveyed for hardness, grain size and microstructure. The area of microscopic extent where maximum hardness and grain size occurred adjacent to the single-bead weld was physically magnified by synthesizing the microstructure by means of a "weld-quench" heat treatment. The latter treatment produces in a half-size Charpy bar practically the same maximum hardness, grain size, and microstructure as are found

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tion of toughness of the heat-disturbed area in such preheated welding tests is suggested as a valuable contribution to the knowledge of welding of the "tricky" steels.

The "weld-quench" test is successful in separating welds into two categories: (1) steels insensitive to the welding quench and therefore easily welded without preheat or other special handling, and (2) steels sensitive to the welding quench such that special care, preheat or preheat and sub-

sequent heat-treatment are required for successful welding.

The test is therefore recommended by Mr. Bruckner as a low-cost method for use in the development of additional steels of easy weldability, for checking heats of steel for weldability before rolling to welding plate size, or for matching heats of steel already in successful welding use in consumers' plants. The purchaser of steel for welding has with the "weld-quench" test, according to the author, a ra-

tional basis for specifying his requirements in lieu of the previously used addition to the specification "and the steel shall be of weldable quality."

Large Stamping Press Installed at Milwaukee

GENERAL MACHINERY CORP., Hamilton, Ohio, has completed the installation of one of the largest stamping presses in American industry in the plant of the Seaman Body Corp., Milwaukee, division of Nash Motors Co., Kenosha, Wis., and the Nash-Kelvinator Corp., Detroit.

The total weight of the press is 500 tons, and the die space measures 100 x 180 in. It is capable of producing an automobile top stamping, 72 x 148 in., from cowl line to the trunk opening, in a single stamping operation. The press has capacity working pressure at the bottom of the stroke of 950 tons on the inner bankholder, 550 tons on the outer bankholder, and 750 tons on the lower plunger.

Sees a Big Future for Factory-Built Steel House

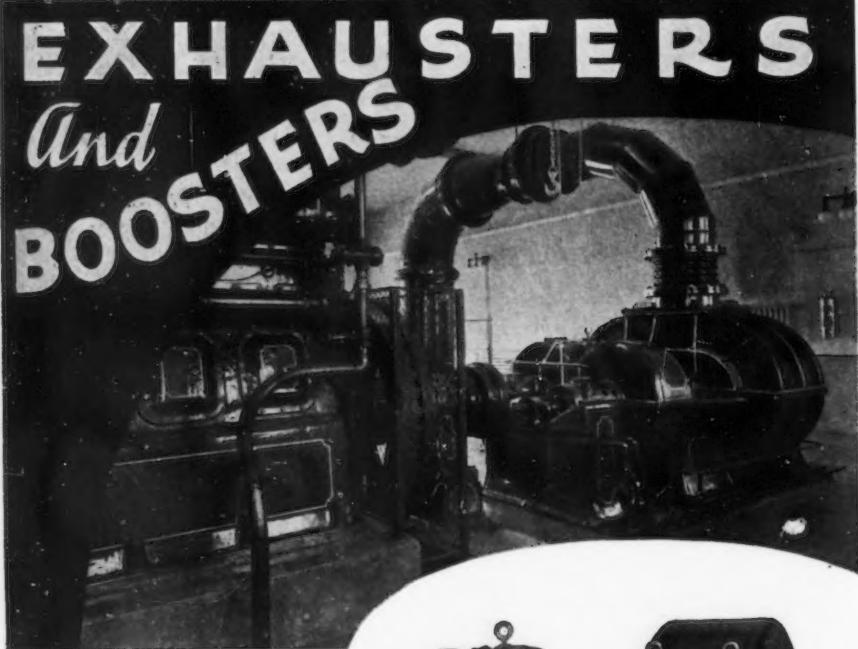
MANY authorities believe it is a foregone conclusion that the low-cost house of the future will be a factory-built package unit complete in all details and sold erected or ready to erect with a minimum of field labor, according to Ray Crow, engineer of the Sales Promotion Division of the Tennessee Coal, Iron & Railroad Co., Birmingham, in an address to the American Society of Agricultural Engineers at Pacific Grove, Cal. Mr. Crow's subject was "Design and Prefabrication of All Steel Building Construction Units or Modules for The Erection of Low-Cost Residences and Other Buildings."

Pennsylvania 44-Hr. Week Law Unconstitutional

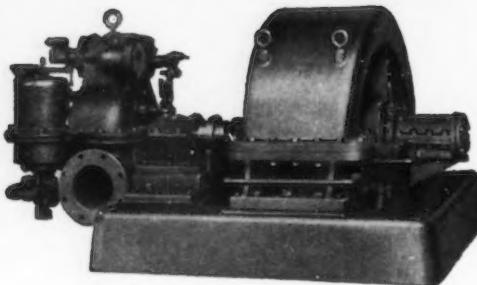
PHILADELPHIA.—The Pennsylvania State Supreme Court last week declared unconstitutional the 44-hr. week law passed some time ago and referring to men only.

Major point in the findings was the unlawful delegation of legislative power. Striking out of this law, however, does not affect the 44-hr. a week law passed last September for female workers.

The legislation found unconstitutional last week was never really enforced, owing to injunctions granted several months ago.



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PWA to Spend \$244,700,000 For Steel and Cast Iron Pipe

WASHINGTON.—Expenditures aggregating \$244,700,000 will be made for steel mill products and cast iron pipe on construction projects financed from the new \$1,800,000,000 PWA program, according to estimates prepared by the Division of Construction and Public Employment, Bureau of Labor Statistics, Department of Labor. Adding to this figure for iron and steel outlays, remanufactured products, including heating and ventilating equipment, doors, shutters, etc., the total amounts to \$315,400,000. The PWA program includes \$965,000,000 for loans and grants for non-Federal projects and \$200,000,000 for Federal projects, which, added to money to be provided by borrowing communities, brings the total expenditures to about \$1,800,000,000.

Estimated expenditures for iron and steel products, as broken down by the Division of Construction and Employment, follow:

Structural and reinforcing steel	\$99,400,000
Products of iron and steel, not classified	97,200,000
Cast iron pipe and fittings	43,500,000
Heating and ventilating equipment	33,900,000
Doors, shutters, window sash, frames, molding and trim	16,800,000
Hardware, miscellaneous	10,300,000
Wire products	3,900,000
Bolts, nuts, washers, etc.	3,200,000
Wrought pipe	3,100,000
Forgings, iron and steel	2,400,000
Nails and spikes	1,700,000
Total	\$315,400,000

Senator Burke Calls For New Labor Act

WASHINGTON.—The National Labor Relations Board completed its third year in office on Tuesday faced with the criticism that most of its "voluntary agreements" negotiated between employers and employees were "forced on employers with their backs to the wall."

Senator Burke, Democrat, of Nebraska, bitter critic of the board and sponsor of an unsuccessful attempt to subject the agency to a Congressional investigation last session, assailed an anniversary statement by the board that 55 per cent of the 11,180 cases closed in the last three years were by agreement of both parties—employers and workers.

"I have made a special study of these agreements," Burke said, adding that there was nothing voluntary about them. "They were shotgun marriages. Instead of being a credit to the board, they reflect discredit. Scores of complaints I have received will bear this out."

Richard Thomas & Co. To Raise £6,000,000 For New Steel Plant

LONDON, JULY 5 (By Cable).—Richard Thomas & Co. will raise an additional £6,000,000 to finance completion of new Ebbw Vale works.

Bank of England and leading banks are to advance £5,500,000 against an issue of 4½ per cent prior lien de-



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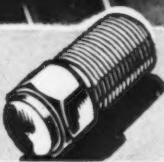
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bentures ranking over existing debentures. The existing debenture holders' rate is to be increased $\frac{1}{2}$ per cent to 4½ per cent. The balance of £500,000 is to be provided by the Bank of England against an issue of ordinary shares, thereby raising ordinary share capital to £11,500,000.

During operation of the scheme a control committee is to be set up consisting of the governor of the Bank of England as chairman; Sir William Firth, present chairman of Richard Thomas; Lord Greenwood, nominated by the steel industry; E. H. Lever, joint secretary, Prudential Assurance Co., nominated by the trustees of existing debenture holders.

J. E. James, chairman, Lancashire Steel Corp.; Col. Sir Charles Wright, chairman, Baldwins; S. R. Beale, chairman, Guest Keen Nettlefolds, are all to be appointed directors of Richard Thomas, which means the new plant will work in cooperation with steel industry and first operations are expected by the end of October.

Steel Employment Lower in May

PAYROLLS of the steel industry in May amounted to a total of \$46,757,000, about 2.2 per cent less than the April total of \$47,809,000, according to the American Iron and Steel Institute. This decline was only about one-third as large as the drop of 6.1 per cent in steel output in May, as compared with April.

A total of 436,000 employees were on the payrolls of the industry during May, as compared with 445,000 in April. This represented the smallest decline in employment in any month since last October.

Between May, 1937, and May, 1938, steel production dropped about 65 per cent, while the number of employees declined less than 27 per cent and total payrolls dropped less than 50 per cent. In May, 1937, the industry employed 595,000 men, and had a payroll of \$92,931,000.

Wage-earning employees of the industry earned an average of 83.6c. per hr. in May, or a cent an hour more than the average of 82.6c. earned in April. In May, 1937, when the higher rate of operations necessitated some overtime work, for which one and one-half times the normal rate is paid, wage-earning employees earned an average of 86c. per hr.

The number of hours worked per week by wage earners in May averaged 24.4, which compares with an average of 25.6 hr. per week in April, and with 38.6 hr. a week in May, 1937.

PERSONALS..

(CONTINUED FROM PAGE 71)

of R. A. ELDRIDGE as traffic manager, succeeding J. A. LINDSAY, JR., who has resigned.

♦ ♦ ♦

WILLIAM W. COLEMAN, president of the Bucyrus-Erie Co., South Milwaukee, Wis., manufacturer of excavators, draglines, wrecking cranes and other heavy duty machinery, has returned from a tour of two months in Europe, visiting the firm's British affiliate, and observing business conditions in England and the Continent.

♦ ♦ ♦

WILLIAM P. FAVORITE has been appointed district representative for Blaw-Knox Co.'s power piping division with headquarters in Detroit.

♦ ♦ ♦

H. W. GREENBERG has been appointed sales manager of the sprinkler division of Blaw-Knox Co., Pittsburgh. Mr. Greenberg has had more than 20 years' experience in connection with the engineering and sales of automatic sprinkler systems.

♦ ♦ ♦

D. E. SADLER has been made comptroller of Cleveland-Cliffs Iron Co., Cleveland, and J. P. LONG made acting auditor, a new position. H. C. SHADE has been appointed general

purchasing agent, with offices in the Union Commerce Building, Cleveland, and GEORGE W. JAEDECKE continues as purchasing agent of the mining department, with offices in Ishpeming, Mich.

♦ ♦ ♦

CHARLES V. ALLEN, treasurer since 1925 of the Westinghouse International Co., has retired after 45 years of continuous service with the Westinghouse Electric & Mfg. Co. He started with the parent company as an apprentice engineer after his graduation from Massachusetts Institute of Technology in 1893, and in 1900 joined the foreign department which later became the Westinghouse International Co.

Prizes Are Awarded for Most Beautiful Bridges

WINNERS of the tenth annual prize bridge contest sponsored by the American Institute of Steel Construction are the Golden Gate bridge, San Francisco, in the monumental class; the Little Hell Gate, low level bridge, New York, in the medium class; the Chesterfield-Brattleboro bridge, New Hampshire, in the small class; and the Marine Parkway bridge, New York, in the movable bridge class. Honorable mention was

given to the Northern Boulevard bridge over Intramural Drive, New York, and to the Shark River bridge, Monmouth County, N. J.

The four structures chosen as the most beautiful bridges built of steel in 1937 were selected by a jury of awards composed of Prof. H. E. Wessman, College of Engineering, New York University; W. H. Yates, consulting engineer, New York; L. A. Reinhard, Reinhard & Hofmeister, New York; W. Lescaze, architect, New York; and K. Reid, editor, *Pencil Points*.

Details of the prize bridges are as follows:

Golden Gate bridge: Fabricator, Bethlehem Steel Co.; chief engineer, J. B. Strauss; consulting engineers, O. H. Ammann, L. S. Moisseiff and C. Derleth; owner, Golden Gate Bridge and Highway District; cost, \$27,000,000.

Little Hell Gate bridge: Fabricator, American Bridge Co.; chief engineer, O. H. Ammann; engineer of design, A. Dana; owner, Triborough Bridge Authority; cost \$530,000.

Chesterfield-Brattleboro bridge: Fabricator, Bethlehem Steel Co.; bridge engineer, J. W. Childs; designing engineer, H. E. Langley; owners, states of New Hampshire and Vermont; cost \$198,426.

Marine Parkway bridge: Fabricator and erector, American Bridge Co.; consulting and supervising engineers on entire project, Madigan-Hyland; consulting engineers on design of lift and flanking spans, Wassell & Hardesty; consulting engineers on design of deck spans, Robinson & Steinman; consulting architect, Aymar Embury II; owner, Marine Parkway Authority; cost, \$3,750,000.



A MASTERPIECE of the bridgemaking's art is the Golden Gate bridge at San Francisco, shown in this striking photograph. This skillful blending of beauty and strength resulted in the structure being chosen, by the jury of awards of the annual prize bridge competition sponsored by the American Institute of Steel Construction, as the most beautiful bridge of monumental size built in 1937. Bethlehem Steel Co. was the fabricator.

...OBITUARY...

EDWARD OTIS GOSS, president of the Scovill Mfg. Co., Waterbury, Conn., died at his home in that city on July 4 after a brief illness. He was 72 years old. He joined the Scovill company as a draftsman in 1888, following his graduation from Massachusetts Institute of Technology. He was made a director 10 years later and in 1900 became assistant treasurer. He was general manager of the plant during the World War, when the company was engaged in arms production for Great Britain and the United States. In 1918 he was made vice-president and treasurer, and president in 1920. He was a member of the New England Council, the American Society of Mechanical Engineers, and of India House.

♦ ♦ ♦

HENRY L. JAMES, former general manager of the Pencoyd, Pa., plant of the American Bridge Co., died at the Hahneman Hospital, Philadelphia, on June 23, aged 71 years. Early in his career he served as a roll turner with the Hughes & Patterson Rolling Mills and with the A. & P. Roberts Co. He entered the mechanical engineering department at Pencoyd in 1893 and was appointed roll designer and superintendent of the roll department seven years later. In April, 1919, he was appointed assistant manager of the Pencoyd rolling mills of the American Bridge Co. and two years later became manager of the rolling mills and foundries. In 1933 he was made general manager of the entire Pencoyd plant. He retired last year after over 48 years of service at that plant.

♦ ♦ ♦

HOMER G. BALCOM, consulting engineer in the steel construction field, died of heart disease in New York on July 3, aged 68 years. He entered steel construction work with the Berlin Iron Bridge Co. in 1897 after his graduation from Cornell University. From 1902 to 1908 he was with the American Bridge Co. and served as structural engineer in the building of the Grand Central terminal in New York. Mr. Balcom was the designer of the steel construction of the Empire State Building and other structures in this and other cities. In 1928 he served on a committee of engineers, sponsored by the American Institute of Steel Construction which devised a new standard of fireproofing for the steel frames of buildings in New York.

He was a member of the American Society for Testing Materials.

♦ ♦ ♦

WILLIAM E. EVANS, retired chief engineer of Youngstown Sheet & Tube Co., Youngstown, Ohio, died June 28 in Youngstown, age 81 years.

♦ ♦ ♦

J. HOWARD WOOD, assistant manager of the United States Steel and Carnegie Pension Fund since its organization January, 1911, died June 26 at Ocean City, N. J. He had been an employee of the steel company since 1904. He was 58 years old.

♦ ♦ ♦

HENRY LAIDLAW, who since 1899 had been the Detroit sales manager for the International Steam Pump Co. and its successor, the Worthington Pump & Machinery Corp., was buried in Cincinnati after funeral services in Detroit on June 27. Mr. Laidlaw came to America in 1880 from Scotland and settled in Cincinnati where he was connected with the McGowan Pump Co. For four years after that he was employed on the construction of the Procter & Gamble soap plant at Ivorydale, Ohio. He later spent a year in the engineering department of Laidlaw-Dunn-Gordon Co. Mr. Laidlaw was a member of the Detroit Board of Commerce, the Exchange Club, Merchant Marine League of the United States and the Detroit Engineering Society.

♦ ♦ ♦

FREDERICK O. BALL, born at Green Island, N. Y., Feb. 10, 1872, and a graduate of the Stevens Institute of Technology, was buried June 27 in Detroit. For the past eight years Mr. Ball had been employed as an experimental engineer at the Chrysler Corp. He was a member of the Franklin Institute.

♦ ♦ ♦

HARRY A. DUFFY, for years purchasing agent for the Ford Motor Co. at the Highland Park plant, and recently purchasing agent for the Michigan Tool Co., died suddenly at his home on June 29. Well known in automotive and industrial circles, Mr. Duffy, born in Springfield, Ohio, 47 years ago, spent virtually his entire life in Detroit, having attended the Amos school there.

♦ ♦ ♦

HORACE SISLER, treasurer of the Colonial Steel Co., Pittsburgh, died at his home in Pittsburgh on June 24.

U. S. Navy Awards 10 Auxiliary Ships And Six Submarines

WASHINGTON.—The Navy Department has announced the following allocation for construction of 10 auxiliary vessels to Navy yards.

Norfolk, Va.: Two minesweepers, about 700 tons each; one harbor tug, 250 tons.

Charleston, S. C.: Two harbor tugs, 250 tons each.

Puget Sound, Wash.: Two seaplane tenders, about 1650 tons each; two harbor tugs, 250 tons each.

Navy Yard, Mare Island, Cal.: One submarine tender, 9000 tons.

Contract for the machinery for the submarine tender consisting of one complete set of diesel propelling machinery and diesel engine driven generators has been awarded to the American Locomotive Co., Auburn, N. Y., for \$1,746,000.

Officials estimated the steel required for the 10 auxiliary ships at 7650 tons.

The department also awarded a \$9,201,000 contract to the Electric Boat Co., Groton, Conn., for the construction of three submarines, with the contract price subject to further adjustment for changes in labor and material costs. In addition it directed the Portsmouth (N. H.) Navy yard to build two submarines and the Mare Island (Calif.) yard one.

The six submarines will cost an estimated \$30,000,000 and require 3800 tons of steel.

Large Piping Job at The New Irvin Works

B LAW-KNOX CO., through its Power Piping Division, is completing ahead of schedule the general mill piping for the new Irvin works of Carnegie-Illinois Steel Corp. This piping installation is one of the largest ever undertaken in connection with an industrial project. It involves about 60 miles of piping, ranging in size up to 48 in. in diameter, and includes lines for high and low pressure steam; filtered, raw and city water; hydraulic systems up to 3500 lb. pressure; air, fuel and acid supply; and circulating oil and grease systems. Most of the lines were pre-fabricated to facilitate the field work, and all lines were joined by electric welding except for connections at valves or to machinery equipment.

June Pig Iron Output Off 12.5 Per Cent

PRODUCTION of coke pig iron in June totaled 1,062,021 gross tons, compared with 1,255,025 tons in May.

Daily output was at the rate of 35,400 tons, against 40,485 tons in May, and represented a drop of 12.5 per cent.

Output for the first half of this year dropped to 7,873,026 tons from 19,706,593 in the corresponding period last year, or a loss of 60 per cent. The daily rate in the six months period was 43,497 tons contrasted with a daily production of 108,876 tons in the same period last year, and approachest most closely the 43,592 tons daily average for the year 1934.

On July 1 there were 70 furnaces making iron, operating at the rate of 34,385 tons daily, compared with 72 furnaces in blast on June 1, producing at the rate of 37,225 tons daily. Eight furnaces were blown out or banked and six were put in operation. The Steel Corporation took four off blast, independent steel producers put three in operation and blew out or banked the same number, and merchant producers blew in three and blew out or banked one furnace.

Among the furnaces blown in were the following: Standish, Chateaugay Ore & Iron Co.; No. 3 Aliquippa, Jones & Laughlin Steel Corp.; Anna, Struthers Iron & Steel Co.; No. 5 Hasletton and one Pioneer, Republic Steel Corp.; and one Colorado Fuel & Iron Co. unit.

Furnaces blown out or banked included: One Donner, Republic Steel Corp.; one Bethlehem, Bethlehem Steel Co.; one Mingo, one Gary, Carnegie-Illinois Steel Corp.; the Jackson Iron Co. unit, one Calumet, Wisconsin Steel Co., and one Ensley and one Fairfield, Tennessee Coal, Iron & Railroad Co.

Daily Average Production of Coke Pig Iron

	Gross Tons	1938	1937	1936	1935	1934
January	46,100	103,597	65,351	47,656	39,201	
February	46,367	107,115	62,886	57,448	45,131	
March	46,854	111,596	65,816	57,098	52,243	
April	45,871	113,055	80,125	55,449	57,561	
May	40,485	114,104	85,432	55,713	65,900	
June	35,400	103,584	86,208	51,570	64,338	
1/2 year	43,497	108,876	74,331	54,138	54,134	
July		112,866	83,686	49,041	39,510	
August		116,317	87,475	56,816	34,012	
September		113,679	91,010	59,216	29,935	
October		93,311	96,512	63,820	30,679	
November		66,891	98,246	68,864	31,898	
December		48,075	100,485	67,950	33,149	
Year		100,305	83,658	67,556	43,592	

Production of Coke Pig Iron and Ferromanganese

	Gross Tons	Pig Iron*		Ferromanganese†	
		1938	1937	1938	1937
January	1,429,085	3,211,500		22,388	23,060
February	1,298,268	2,999,218		20,205	24,228
March	1,452,487	3,459,473		21,194	27,757
April	1,376,141	3,391,665		18,607	26,765
May	1,255,024	3,537,231		13,341	34,632
June	1,062,021	3,107,506		14,546	34,415
1/2 year	7,873,026	10,706,593		110,281	170,857
July		3,498,858		...	23,913
August		3,605,818		...	29,596
September		3,410,371		...	26,100
October		2,892,629		...	26,348
November		2,006,724		...	25,473
December		1,490,324		...	22,674
Year		36,611,317		...	324,961

*These totals do not include charcoal pig iron.

†Included in pig iron figures.

Merchant Iron Made, Daily Rate

	Tons	1938				
		1938	1937	1936	1935	1934
January	10,635	16,106	10,537	3,926	7,800	
February	8,854	16,514	11,296	6,288	7,071	
March	8,524	16,457	10,831	7,089	7,197	
April	8,273	14,617	13,897	8,799	8,838	
May	6,431	19,433	12,814	8,441	9,099	
June	5,375	15,870	14,209	7,874	9,499	
July		19,609	11,619	8,644	7,880	
August		17,831	12,148	8,194	6,043	
September		20,065	12,526	10,090	4,986	
October		18,950	13,645	11,199	5,765	
November		15,662	14,739	12,503	6,610	
December		10,964	14,852	13,312	4,399	

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		July 1	June 1	Tons	
	June (30 Days)	May (31 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
<i>New York:</i>						
Buffalo	72,294	92,758	12	2,410	1	440
Other New York and Mass.	14,223	10,756	4	690	5	385
<i>Pennsylvania:</i>						
Lehigh Valley	42,405	43,272	3	1,200	4	1,395
Schuylkill Valley		12,063	0		0	
Susquehanna and Lebanon Valleys	13,504	13,583	1	450	1	440
Pittsburgh District	184,380	207,984	11	6,585	10	5,770
Ferro. and Spiegel	9,730	7,640	2	325	2	300
Shenango Valley	17,463	20,470	1	580	1	660
Western Pennsylvania	23,683	34,286	2	790	12	1,105
Ferro. and Spiegel	4,816	5,701	1	160	1	185
Maryland	80,224	82,521	4	2,675	4	2,660
Wheeling District	69,010	82,629	4	2,040	5	2,670
<i>Ohio:</i>						
Mahoning Valley	99,190	95,847	7	3,380	5	2,700
Central and Northern	69,840	75,562	5	2,330	5	2,435
Southern	18,510	22,076	2	490	3	710
<i>Illinois and Indiana:</i>	183,616	258,740	9	5,595	11	7,490
<i>Michigan and Minnesota:</i>	38,330	42,199	3	1,280	3	1,360
<i>Colorado, Missouri and Utah:</i>	15,918	17,699	3	570	2	570
<i>The South:</i>						
Virginia		0		0		
Kentucky	9,129	10,665	1	305	1	235
Alabama	95,756	118,573	5	2,530	6	3,165
Tennessee		0		0		
Total	1,062,021	1,255,024	70	34,385	72	37,225

Pickets Defy Injunction

At Chicago Foundry

CHICAGO.—CIO pickets at the North Chicago, Ill., plant of the Chicago Hardware Foundry Co. early this week defied a court injunction forbidding them to interfere with employees wishing to return to work. The plant has been closed since June 6 when a strike was called in protest against a 10 per cent wage cut and abolition of paid vacations of one week this year because of business conditions.

Newton, Iowa, Chamber of Commerce representatives this week urged Iowa's governor to send National Guard troops to open the Maytag Washing Machine Co. plant in Newton to employees who wish to work. Closed since May 9 by a CIO strike, 1,400 employees have been out of work because of the union's protest against a 10 per cent wage cut.

Basing Point Changes May Alter

OWING to the complexities of the situation arising from the elimination of basing point differentials on steel products and the establishment of a new mill basing points at all important producing centers, only broad generalizations are possible as to the ultimate effects of this radical alteration of the industry's pricing methods.

It may be months before the final results of the change can be correctly appraised. That a considerable dislocation of the industry, both in producing and consuming branches, may eventually take place is generally conceded. How far-reaching this may be is dependent upon circumstances that will become clear only as individual companies in both producing and consuming lines have had an opportunity to test thoroughly the new set of conditions.

Comments in the trade range from the extreme view that an economic upheaval is in the making to the more conservative opinion that, while many adjustments will be necessary, they will come about gradually and perhaps without great disturbance over a period of a few years.

Heavier Losses for All Companies

The immediate result will be much heavier losses for all steel companies. Even a wage reduction probably will not compensate for the much lower net yield that steel companies will derive from sales under the new plan. It is estimated that a lowering of wage rates of 25 to 30 per cent would be necessary to offset the reduction in revenues brought about by the combination of lower prices and elimination of basing point differentials. While no official information is available on the subject of wage reductions, it is doubted that labor costs will be cut sufficiently to give steel companies a profit even at operating rates considerably above 40 per cent, which has until recently been believed to be approximately the break-even point for the most efficiently managed companies.

Under the circumstances, steel buyers may become persuaded before very long that further price cuts are

By C. E. WRIGHT

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not likely and that, in fact, the experience of the industry under the new plan will make it necessary for some companies to obtain higher prices.

Consumers Will Benefit

With perhaps few exceptions, steel consumers stand to benefit greatly not only from the outright reductions in prices but from the fact that basing points have been established so that they make a further saving from a lower freight cost. Where there is any dissatisfaction among consumers, it probably arises from the fact that they are disadvantageously situated with respect to a source of supply as compared with their competitors or because the marketing of their products on a country-wide basis has been rendered less profitable in certain areas, such as the South, if they must ship from distant points.

Products in which steel is a considerable element of cost and which are now distributed nationally from a single plant situated in the North or in the Central West may be at somewhat of a disadvantage in the South and East. Companies in this position may eventually find it economically advisable to establish branch manufacturing plants in areas where they have the combination of a good market and low steel costs. For example, the establishment of Eastern basing points on sheets for the first time so greatly reduces the cost of sheet metal fabrication in the East that Western plants with a good Eastern market for their products may decentralize their manufacturing.

Sheets \$8 Lower at Baltimore

Until this change in basing points came about, the delivered cost of hot rolled sheets at Baltimore was 2.30c. a lb., base Pittsburgh plus 30c. per 100 lb., freight, or 2.60c. a lb., delivered. Now, with a Sparrows Point base on hot rolled sheets of 2.15c., plus 4.5c. per 100 lb., freight, the Baltimore delivered cost is 2.195c. a lb., a net sav-

ing to the Baltimore fabricator of \$8.10 a ton.

A steel producer at a distant point in order to avoid the loss of a good customer in Baltimore must absorb \$6.60 a ton freight. In other words, the grade of sheets that nets the Sparrows Point mill 2.15c. a lb. would net the Youngstown mill only 1.865c. a lb.

Countless examples of this sort can be cited. A Northern mill the other day sold a carload of wire products for shipments to New Orleans on which the net price at mill was \$9 a ton below that which would have been obtained a few weeks ago.

There are large plate fabricators in Baltimore, which enjoys a freight rate of only 4.5c. a 100 lb. from the nearby Sparrows Point plant of Bethlehem Steel Co. The Sparrows Point base on plates is 2.10c., making a delivered price at Baltimore of 2.195c. To meet this competition, a Pittsburgh mill must absorb 25.5c. per 100 lb. in freight costs (the Pittsburgh-Baltimore rate being 30c.), which brings the Pittsburgh net to 1.845c., which is undoubtedly below cost even on an adjusted wage scale.

South Will Benefit

Although steel companies themselves will not benefit from this change in pricing methods, some sections of the country undoubtedly will in due time benefit immensely, the South in particular. Not only will Southern steel mills find a wider market geographically for their products, but many industrial users of steel who have a good market for their products in the South may find it advantageous to establish Southern plants in order to obtain the benefit of lower steel and labor costs. The lower labor costs were already in existence, but the combination with lower material costs together with low freight rates to the Southern market will develop the South industrially to a degree not hitherto experienced.

If the Southern States win in their effort to have Southern rail rates reduced to a parity with Official Classification rates, Birmingham's market position will be further improved and Northern mills will be almost frozen

Industrial Map of the United States

BASING POINTS ON STEEL PRODUCTS AS AFFECTED BY RECENT CHANGES

Editor's Note: This list is tentative subject to possible further changes.

	Pittsburgh	Chicago	Cleveland	Youngstown	Buffalo	Sparrows Point	Birmingham	Canton	Coatesville	Claymont, Del.	Bethlehem, Pa.	Middletown ^a	Worcester, Mass.	Lorain, Ohio
Blooms, billets, slabs—carbon	x	x	x	x	x	x	x							
Sheet bars	x	x	x	x	x	x	x							
Skelp	x	x		x	x	x			x	x				
Plates	x	x	x	x		x	x	x						
Structural shapes	x	x			x		x				x			
Bars and small shapes	x	x	x	x	x	x								
Reinforcing bars—billet steel	x	x	x		x	x	x							
Strip steel—hot rolled	x	x	x	x			x				x			
Strip steel—cold rolled	x	x	x	x							x			
Sheets—hot rolled	x	x	x	x	x	x	x				x			
Sheets—cold rolled	x	x	x	x	x	x	x				x			
Sheets—galvanized	x	x		x	x	x	x				x			
Cold finished bars and shafting—carbon	x	x	x		x									
Wire rods—hot rolled	x	x	x	x										
Wire—manufacturers' drawn	x	x	x				x							
Wire nails, staples and spikes	x	x	x					x						
Woven fence and barbed wire	x	x	x					x						
Pipe—standard, line and oil country	x	x*									x			

* \$4 over Pittsburgh — Lorain price.

out of a good deal of Southern territory.

The area in which steel production facilities are so largely concentrated, namely western Pennsylvania, Ohio and West Virginia is faced with these disturbing factors: 1. Its total productive capacity is greater than its consuming capacity and therefore it has been necessary to reach out considerable distances for business; this will now be costly because of the larger absorption of freight costs that will be required to meet competition. 2. Southern mills, having lower base prices, will encroach on the bor-

ders of what has been considered logical Pittsburgh territory—for example southern Pennsylvania, Kentucky and Missouri, while Eastern mills will also push toward the Pittsburgh territory rather than go too far west where freight absorption would be greater. An outstanding example is Bristol, Va.-Tenn., where previously the Sparrows Point mill was at a disadvantage; now with a Sparrows Point base on nearly all products, the advantage lies with that mill, which has a freight rate to Bristol of 35c. a 100 lb. against 42c. from Pittsburgh and 40c. from Birmingham. Similar situations have

been uncovered in a number of cities along the North-South border.

The Eastern Situation

In the East steel producing facilities are generally believed to be less than normal consumption requirements, a factor which will aid the mills situated along the Atlantic Seaboard. However, this may not be a permanent advantage because steel companies in the central territory which have long enjoyed a large Eastern business are hardly expected to relinquish established trade even temporarily if they can hold it by making the necessary sacrifices. If the new price relationships between districts continue to exist, steel plant expansion in the East may be expected eventually. The same situation holds with respect to the South, where a growing market for steel, brought about by industrial migration to that territory, would create opportunity for greater steel-making facilities.

No matter what the immediate sacrifices may be, it is taken for granted in the industry that the larger steel companies will take every practical step toward holding the trade that they have been years in building up no matter where it is located. Water transportation will play an increasingly important part in the effort of steel companies to overcome disadvantages brought about by the new price set-up. Chicago, Cleveland and Buffalo mills will undoubtedly use the Great Lakes to a greater extent than ever before to save money on transportation costs. Mill depots, which are already in existence down the Mississippi River for Southern and Southwestern steel distribution, may become more numerous for such products as pipe, galvanized sheets, wire nails, reinforcing bars and others that can be made in advance and stored to await orders. It is regarded as likely that mergers of steel companies may become a possibility in cases where plants in different territories could advantageously be brought under one management to meet the new situation. Expansion of existing plants to include other products may be considered by some companies. These are merely speculative possibilities, and no

plan along these lines has been seriously discussed so far as can be learned, but as developments point the way some of these things may become realities.

One serious by-product of the new situation is the effect that it may have on the railroads. The carriers will undoubtedly lose some of their profitable long-haul business because cross-hauling of steel from West to East and vice versa will be minimized. On some of their own purchases, the railroads have often given the business to mills from which they would receive the longest haul, but they will perhaps be less inclined to do this under the new pricing arrangement.

All-Rail Rates to Govern

In all of the changes that have been made, however, there has been no suggestion of a departure from the policy of quoting delivered prices which would include the all-rail freight rate from mill to delivery point. Some consumers and distributors who are so situated that water or truck shipments are desirable have raised the point as to whether absolute mill prices can be obtained; that is, whether the mill will sell at its f.o.b. price, the buyer to pay the freight by whatever means of transportation is most advantageous to him. It is recognized now, in trade circles at least, more so than ever before that such a situation would produce chaos in steel selling. During the hearings that were conducted by Senator Burton K. Wheeler's committee on the basing point bill proposed by the Federal Trade Commission some witnesses charged that they were being discriminated against in their steel purchases because they were not permitted to avail themselves of their locations on water and obtain the benefit of low water rates. It may be doubted that this point would be officially stressed in Washington until the outcome of the changes already made have been fully digested.

In its announcement of Youngstown basing, the Youngstown Sheet & Tube Co. was quite specific on this matter, saying: "For delivery to points outside the switching limits of Youngstown, full published railroad rates will be added."

Institute in 1935 Predicted Industrial Dislocation

In a brochure published March 13, 1935, entitled "Basing Points and Competition in Steel," the American Iron and Steel Institute defended the

then existing system, which has now been changed, and predicted that "if the basing point method were not to be continued, the effects of such a change would be very serious dislocation of producing activities among members of the industry and very serious disruption of long-established commercial relationships between producers and consumers of steel products."

Continuing, this brochure said:

"It is not easy to predict all the effects which would follow from discontinuing the basing point method of quoting prices for steel products but among the effects there would be in some places restriction of markets, lessened production and sharp decreases in the demand for labor, possibly to the ultimate elimination of some activities on which many workers depend. In other places there would be monopoly of important markets, stimulated production, and accompanying sharp increases in the demand for labor.

"These aspects of the question were discussed by representatives of the industry who helped in drafting the Steel Code and it was then recognized that while it might be greatly to the selfish advantage of some members of the industry to favor some method other than the basing point method of quoting prices, such as f.o.b. mill, it was generally agreed that there should not be any effort to change the existing conditions under which the industry had been developed and which were then satisfactory. The reason for that conclusion was the realization that any such change would create conditions tending to defeat the purposes of the National Industrial Recovery Act with respect to the re-employment of workers and the creation of conditions of fair competition.

"Individual producers of steel products would be affected in very different ways by any action discontinuing the basing point method of quoting prices for their products. Any producer operating a plant in or close to important markets for steel products would probably find himself enjoying a practical monopoly of that market, at least up to the point of the ability of his plant to produce, and, if the extent of his capacity was not fully adequate to supply such market, there would be a strong tendency to expand such capacity to take care of all such requirements.

"On the other hand, a producer operating a plant not advantageously located with respect to important markets would find his field of activity

seriously restricted, with resulting inability to operate to any greater extent than the limited local demand would require. For such a producer the effect would be a shrinking of activity and probable abandonment of the no longer usable capacity.

"Plants located in or near Detroit, for example, producing the classes of steel products consumed by automobile manufacturers, presumably would enjoy a virtual monopoly of the demand from that important market up to the limit of their ability to satisfy that demand. Producers located elsewhere presumably would not be able to share in the demand from the automobile industry in Detroit and vicinity except when local mills were fully occupied and therefore unable to take on any additional orders. Mills located at other places, like Youngstown, Pittsburgh and Wheeling, which have been accustomed to share substantially in the demand from the automobile industry in Detroit and vicinity, presumably would be unable to participate in the Detroit orders until the local Detroit mills were fully employed.

Localizing of Business Prophesied

"Such conditions would tend definitely to localize the steel business and to create sharp inequalities of production and employment among the different members of the industry and different districts. In the Detroit district, for example, the capacity to produce all classes of steel products for sale is less than 1,000,000 tons a year, but the demand for steel products from consumers located in that district, when the automobile industry is at all active, is probably three or four times the ability of the local mills to produce.

"In the district within a radius of 75 miles of Pittsburgh, on the other hand, there is probably a capacity of close to 20,000,000 tons a year of all classes of steel products made for sale, but the demand from local consuming industries is probably not more than one-third of the capacity of the mills to produce.

"It must be apparent that plants located at or near places where local market demand commonly runs close to or in excess of capacity of such plants to produce would be in a position to monopolize such markets up to the full limit of their capacity. Such local monopolies inevitably would tend toward establishing at each producing point prices for products at the highest level consistent with the desire to exclude from the monopolized markets

any competing products from other producing points. In general, therefore, there would be less, rather than more, competition for the business offered in most districts, and there would be sharp differences of price for any given product at different places of consumption in the United States, depending on the degree of local monopoly enjoyed by some producing interests. As a result there would be

ply, while at the same time keeping in mind the market in which they must sell the bulk of their finished products.

A manufacturer of steel products in the North might thus find it desirable to establish a branch plant in the South. One whose plant is in the Central West but which enjoys a substantial market for its products in the East might likewise find it advisable

CARLOAD FREIGHT RATES ON STEEL PRODUCTS BETWEEN IMPORTANT CONSUMING AND PRODUCING CENTERS

	Pittsburgh	Bethlehem	Coatesville	Weirton	Youngstown	Cleveland	Chicago	St. Louis	Detroit	Sparrows Pt.	Buffalo	Worcester
Jersey City	36	17	20	36	39	41	52	57	43	24	34	26
Harrison, N. J.	36	15	20	36	39	41	52	57	43	24	34	26
Hartford	41	25	27	41	42	42	53	59	44	31	35	17
Bridgeport	40	23	24	40	42	43	53	59	44	28	35	22
Waterbury	40	24	26	40	42	42	52	58	43	30	34	21
Boston	44	31	33	44	44	44	55	62	46	36	37	*12
Rochester, N. Y.	29	29	31	29	26	26	42	47	29	32	13	33
Philadelphia	32	11½	9½	32	35	39	50	54	43	17	34	29
Harrisburg	26	17	13	26	30	33	46	51	41	16	30	34
Scranton	30	18	21	30	33	35	47	53	39	25	27	31
Easton	32	5	15	32	35	39	50	54	42	22	31	29
Reading	30	9	9½	30	33	36	47	53	42	19	32	31
Cincinnati	29	43	42	29	29	26	28	29	27	41	35	51
Columbus	23	40	39	23	23	20	29	35	23	37	30	47
Dayton	27	42	42	27	26	23	26	32	24	40	33	48
Toledo	26	42	41	26	23	19	26	36	11½	40	29	46
Akron	19	37	36	17	11	8	32	40	23	35	25	44
Rock Island	43	54	53	43	41	39	19	20	35	53	44	58
Springfield, Ill.	41	52	52	41	40	37	20	34	35	50	43	58
Indianapolis	33	46	45	33	31	29	23	26	28	44	37	52
Milwaukee	40	50	50	40	37	34	113	28	28	50	39	53
Flint	31	42	43	31	28	24	26	39	12½	44	27	45
Baltimore	30	21	16	30	33	36	47	52	42	*4½	34	34

* Motor Compelled

¹ Certain articles take a Motor Compelled Rate of 9½.

great confusion and inequality of competition among purchasers of steel products. Such conditions cannot be in keeping with the larger interests of the steel industry or in keeping with the public interest."

Each Problem Is Different

It is not easy to visualize the effects that will be produced upon the consumers of steel because each company's problem is peculiar unto itself and the class of trade it caters to. Broadly, it may be said that a good many consumers of steel whose plants are not now favorably situated with respect to obtaining the lowest possible delivered price for the steel they use may consider removal to a location nearer to a source of steel sup-

ply, while at the same time keeping in mind the market in which they must sell the bulk of their finished products.

Whether such moves will be numerous enough or important enough to create serious dislocations and thereby seriously affecting individual communities and labor is a question that may be debated for some time to come. It seems probable that not many changes of this kind will come about until manufacturers have had full opportunity to study the situation in the light of their own experience. However, there are many in the steel industry who firmly believe that over the next few years the situation will create industrial and economic changes that at present can only be guessed at.

Effect on Small Mills

What the effect will be on the smaller mills is likewise subject to the test of time. Several small producers who have discussed the subject with THE IRON AGE stress that they will have to seek as much business as possible in their own backyard in order to stay in the picture.

A non-integrated sheet producer in the central district said: "The situation narrows down to where every producer must find his best market in his own backyard. There will be a lesser return for everybody in the steel industry."

A non-integrated maker of seamless tubing said: "The situation right now appears to be disastrous to people like us since no downward change has been made in labor. We are given a \$3 reduction on our billets, but we must give as high as \$7.50 on our finished products to consumers."

Another sheet producer, non-integrated, said: "It appears as if somebody started something which might become a Frankenstein. The outlook is certainly gloomy for profit possibilities of the steel industry, for wages would have to be cut as much as 30 per cent to compensate for some of the price cuts. While we receive \$3 reduction on our sheet bars, we will have to give \$7 reduction on sheets to our customers."

What About Good Times?

While this radical departure from past practices in steel selling comes at a time when business is at low ebb, attention will some time be focused on what may happen under conditions of abnormally large demand, such as existed in the first half of 1937. Under such a condition, it is believed that the consumer might "pay through the nose," particularly in districts where he hasn't many nearby sources of supply. With f. o. b. mill prices ruling, it is unlikely that mills would go farther afield than necessary in good times to take business except from regular customers. Thus a steel user who was unable to obtain sufficient supplies from his own nearby source and who tried to buy farther away might be obliged to pay full freight from mill to destination regardless of the mill basing point in his own district.

All of which points to the probability that the real tests of the new situation will come when business gets better—say above 50 per cent of ingot capacity—rather than during a dull period like the present.

Eastern Railroads to Obtain \$40,000,000

ADDITIONAL revenue of about \$40,000,000 a year will be derived by eastern railroads as a result of an Interstate Commerce Commission decision on Wednesday, July 6, permitting an increase in passenger fares from two cents to two and one-half cents per mile for a trial period of 18 months.

Steel Ingot Output Slightly Lower in June Than in May

STEEL ingot output in June totaled 1,638,277 gross tons, according to the monthly report of the American Iron and Steel Institute. Figured on a weekly average this was about 6.4 per cent below the May total of 1,806,805 tons. The June operating rate for the industry averaged 28.46 per cent against 30.39 per cent in May.

The six months' total was 10,819,144 tons, or an average operation

through the half year of 31.17 per cent. June was the low month by a narrow margin and March was the best month.

Steel Cartel is Renewed to 1940

WASHINGTON.—At a meeting of the Managing Committee of the International Steel Cartel which was recently held in Paris, the international agreement was renewed to extend until Dec. 31, 1940. The 1935 convention between British industry and Continental plants was renewed for the same period, according to a report to the Department of Commerce by the office of the American Commercial Attaché at Brussels. Delegates of the British Iron and Steel Federation as well as representatives of exporting American steel plants were present at the meeting, the report stated. The report also stated that formal agreements between American exporters and the International Steel Cartel had been made. By unanimous decision the Cartel determined to maintain prevailing export prices on the steel products it sells.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

1937	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
January	4,349,024	292,209	4,718,436	1,065,110	4.43	81.32
February	4,011,852	331,629	4,414,699	1,103,675	4.00	84.27
March	4,730,943	403,400	5,218,326	1,177,952	4.43	89.94
1st Quarter	13,091,819	1,027,238	14,351,461	1,115,977	12.86	85.20
April	4,600,418	388,783	5,070,867	1,182,020	4.29	90.25
May	4,686,052	382,671	5,151,909	1,162,959	4.43	88.79
June	3,832,082	284,615	4,184,723	975,460	4.29	74.48
2d Quarter	13,118,552	1,056,069	14,407,499	1,107,417	13.01	84.55
1st 6 Months	26,210,371	2,083,307	28,758,960	1,111,672	25.87	84.88
July	4,147,227	335,456	4,556,304	1,030,838	4.42	78.43
August	4,425,998	373,259	4,877,826	1,101,089	4.43	83.83
September	3,950,899	268,472	4,289,507	1,002,221	4.28	76.30
3d Quarter	12,524,124	977,187	13,723,637	1,045,212	13.13	79.58
1st 9 Months	38,734,495	3,060,494	42,482,597	1,089,297	39.00	83.09
October	3,148,321	188,715	3,392,924	765,897	4.43	58.31
November	2,004,890	113,885	2,154,365	502,183	4.29	38.23
December	1,362,010	86,833	1,473,021	333,263	4.42	25.37
4th Quarter	6,515,221	389,433	7,020,310	534,270	13.14	40.68
Total	45,249,716	3,449,927	49,502,907	949,423	52.14	72.38
1938						
January	1,604,363	99,991	1,732,764	391,143	4.43	29.15
February	1,550,772	125,493	1,703,726	425,932	4.00	31.74
March	1,822,398	157,737	2,012,406	454,268	4.43	33.85
1st Quarter	4,977,533	383,221	5,448,896	423,709	12.86	31.58
April	1,762,315	131,644	1,925,166	448,757	4.29	33.44
May	1,647,949	130,590	1,806,805	407,857	4.43	30.39
June	1,519,589	118,688	1,638,277	381,883	4.29	28.46
2d Quarter	4,989,326	380,922	5,370,248	412,778	13.01	30.76
1st 6 Months	10,055,001	764,143	10,819,144	418,212	25.87	31.17

NOTE: 1937 figures and some in first quarter of 1938 have been revised.

....PIPE LINES....

Continental Oil Co., Ponca City, Okla., plans new 6-in. welded steel pipe line from Lance Creek, Wyo., oil field to Denver, about 250 miles, for crude oil transmission to refinery at last noted place. Application for permission has been made in name of Pilebur Corp., an affiliated interest, recently referred to in these columns. Right-of-way is being secured and surveys are under way. Cost close to \$2,750,000 with booster pumping stations and other operating facilities. Executive offices of first noted company are at 60 East Forty-second Street, New York.

Bureau of Supplies and Accounts, Navy Department, Washington, closes bids July 12 for 4150 lin. ft. of 12-in. steel pipe; also for 4150 ft. of 12-in. wrought iron pipe, for Eastern and Western Navy Yards (Schedule 3844).

Big Spring, Tex., plans 14-in. steel pipe line for main water supply from new source about 14 miles from municipality, connecting with city filtration plant. Water source will be developed through construction of earth dam and concrete reservoir. Installation will include elevated steel tank and tower, and other structures. Cost about \$500,000. Financing has been arranged through Federal aid. Joseph E. Ward, Harvey-Snider Building, Wichita Falls, Tex., is consulting engineer.

Board of District Commissioners, District Building, Washington, has low bid from Columbia Foundation Co., Inc., 2207 Channing Street, N.E., at \$51,254.23 for 3260 lin. ft. of steel pipe for main water line in Washington Circle district.

Bureau of Reclamation, Denver, asks bids until July 19 for one plate-steel pump-discharge manifold for Owyhee Ditch pumping station, Owyhee project, Oregon-Idaho (Specifications 1095-D).

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., Col. T. A. Liesen, secretary, plans steel pipe lines for gas distribution in district No. 845, recently created.

Spokane, Wash., has received identical low bids from Crane Co., Spokane, and Marshall Wells, Spokane, on 12,500 ft. of 24-in. o.d. steel pipe. This city also opened bids June 30 on 12,000 ft. of 6-in. cast iron pipe.

Los Angeles Department of Water and Power has low bid from Western Pipe & Steel Co., Los Angeles, on 5508 ft. of 14-in. i.d. steel water pipe.

RAILROAD BUYING

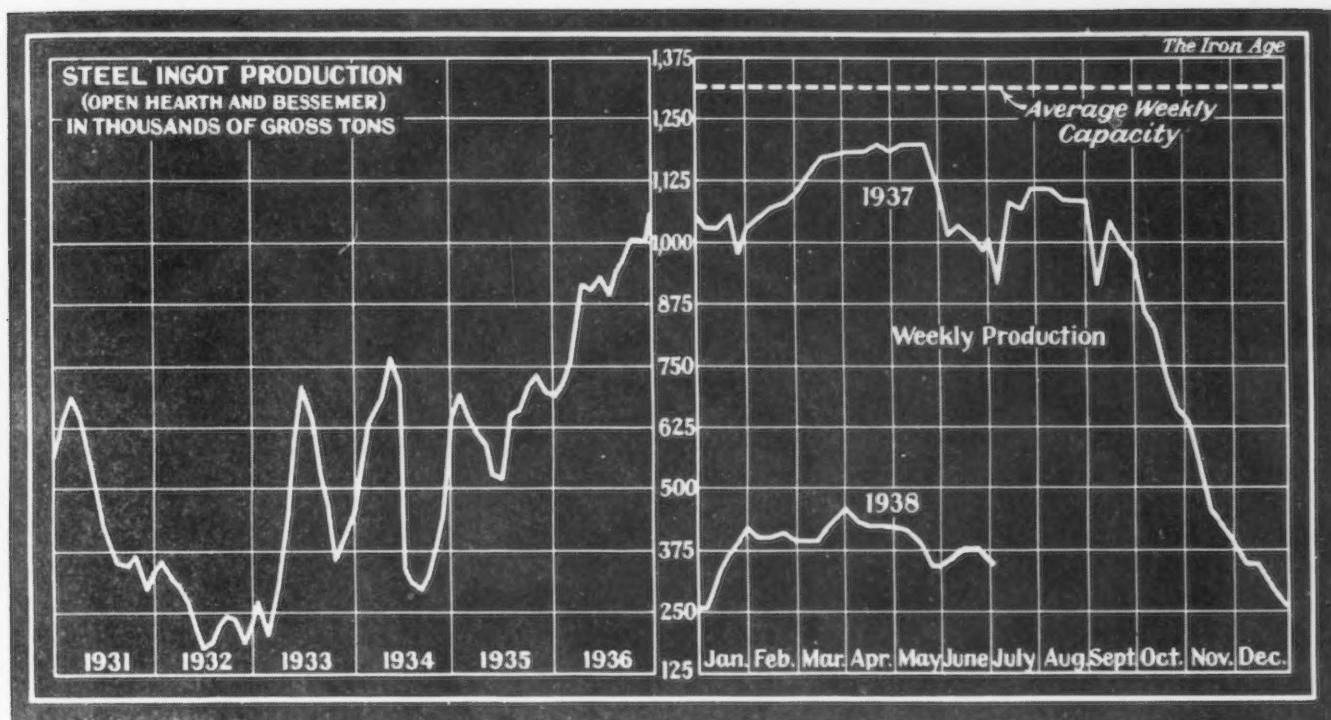
Lehigh & New England has ordered 50 70-ton cement cars from American Car & Foundry Co.

Bethlehem Mines Corp. has ordered seven dump cars from Austin-Western Road Machinery Co.

New Law Protects Pickets And Rights to Organize

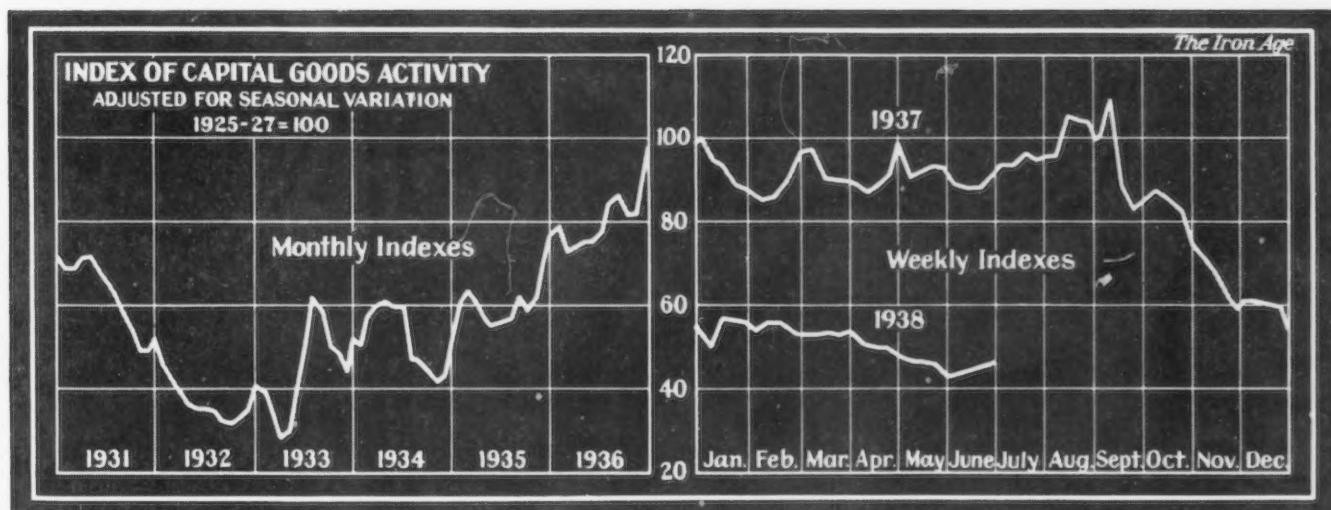
WASHINGTON.—President Roosevelt last Thursday signed a bill which prohibits interference with peaceful picketing or the rights of workers to organize. Fines and imprisonment are provided against strikebreakers who cross state lines.

Holiday Cuts Ingot Production to 23 Per Cent



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Philadel-	Cleve-	Wheel-	Buffalo	Detroit	Southern	S. Ohio	Western	St. Louis	East-	Aggre-
CURRENT WEEK...	16.0	24.0	21.0	19.0	12.0	48.0	27.0	29.5	39.0	30.0	22.0	10.0	23.0
PREVIOUS WEEK...	26.0	27.0	22.0	23.0	22.0	44.0	28.5	29.5	39.0	18.0	30.0	42.0	10.0
	10.0	28.0											

Increased Construction Activity Raises Index



BOLSTERED by a substantial gain in the dollar volume of the week's construction awards, the index of capital goods activity rose 1.1 point to 45.9 in the week ended July 1. Public projects alone were responsible for the gain in the construction series, with last week's awards for this class of work 76 per cent higher than in the comparable week of 1937. The improvement in the position of the other components of the index was due to adjustment of the unchanged volume of physical output against a declining seasonal trend. The average index for the month of June was 44.2.

	Week Ended July 1	Week Ended June 25	Comparable Week
Steel ingot production ¹	39.0	38.3	1937 137.1
Automobile production ²	38.8	38.0	116.8 108.5
Construction contracts ³	57.1	53.9	69.5 120.4
Forest products carloadings ⁴	48.9	48.3	72.9 117.6
Production and shipments, Pittsburgh District ⁵	45.6	45.5	103.8 127.9
Combined index	45.9	44.8	94.1 122.3

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. Engineering News-Record; 4. Association of American Railroads; 5. University of Pittsburgh.

...SUMMARY OF THE WEEK...

... Steel business dull, pig iron more active, under new prices.

• • •

... Consumers will benefit greatly from new basing points.

• • •

... Holiday week cuts production; steel scrap up in all markets.

STEEL business is in a state of virtual stagnation while buyers digest the ramifying conditions arising from the elimination of basing point differentials between districts and the establishment of new basing points.

Under any circumstances, operations of the industry probably would have been lower this week, owing to the usual holiday influences, but with the confusion that has resulted from price and basing point changes, a drop of only five points, from 28 per cent last week to 23 per cent this week, may be regarded as a fair augury of a moderate upward trend as soon as producers and consumers have got their bearings. June business for many steel companies was 10 to 15 per cent better than that of May.

Consumers of steel will benefit greatly from the new price set-up, particularly in the East and South. At Baltimore, where the Bethlehem Steel Co. has established a base price on hot rolled sheets from its nearby Sparrows Point mill, buyers will obtain their material at about \$8 a ton less than a few weeks ago on a Pittsburgh base. In many other instances consumers will save much more than the amount of the actual price reduction because of more favorably situated basing points.

On the other hand, many steel mills, especially those in the central district embracing western Pennsylvania, Ohio and West Virginia, will be obliged to absorb \$2 to \$3 a ton, and in some instances more, in order to hold their trade at distant points. A Youngstown mill shipping hot rolled sheets to Baltimore will have a freight rate absorption of \$6.60 a ton against 60c. formerly. Nearly all steel companies will add to their losses under present conditions of poor demand, and their profit margins will be reduced even in better times unless prices are advanced.

Even wage reductions of the proportions that might be expected—say 10 to 20 per cent—would not compensate all companies for their lower net yield.

Whether steel consumers will soon become persuaded that present steel prices are about as low as might reasonably be expected and start a buying movement remains to be seen, but in pig iron, where price cuts were not complicated by basing point changes, a fairly strong upward trend in orders has almost immediately developed, particularly at Chicago, St. Louis and Cleveland.

DEVELOPMENTS of the past week in the basing point situation have included the setting up of new basing points at Youngstown and Middletown, Ohio, on sheets and strip; plate basing points at Cleveland and Claymont, Del.; the establishment of Detroit delivered prices on sheets, strip and bars only \$2 a ton above Pittsburgh, Cleveland or Chicago base prices; and announcement of a Chicago base on cold rolled strip. Mills situated at less important centers have considered the adoption of f.o.b. prices, but apparently for the present are content to meet the quotations of their competitors in nearby basing points.

Following changes on major products, reductions have been put into effect on steel axles, down \$4 a ton; wrought iron pipe is off \$8 a ton on black and \$10 on galvanized; rail steel bar prices have been brought into line with billet steel prices.

On standard steel pipe a further reduction has occurred at Chicago. The original reduction was \$8 a ton on black and \$10 on galvanized, conforming to cuts at Pittsburgh and Lorain, but a Chicago district producer has made a further reduction of \$2. Thus the total cuts at Chicago are \$10 on black butt weld and \$12 on galvanized butt weld.

GOVERNMENT spending may soon make itself felt in the steel markets, judging from many contracts awarded at Washington, particularly for Army and Navy work. A PWA grant has been assured for Chicago subway construction, which will take 35,000 to 40,000 tons of steel. Structural steel lettings in the week totaled nearly 17,000 tons, mostly public work, and new projects out for bids amount to 19,000 tons. A Chicago mill booked 11,000 tons of sheet piling for Los Angeles Flood control work.

STEEL scrap prices continue to advance. At Detroit, where material is scarce, increases were as much as \$2 to \$3 a ton. THE IRON AGE scrap composite price has risen 50c. to \$12.58.

Pig iron output in June was 1,062,021 gross tons against 1,255,024 tons in May, a loss of 12.5 per cent on the daily basis of 35,400 tons last month. The half-year output was 7,873,026 tons, compared with 19,706,593 tons in the first half of 1937. On July 1 there were 70 furnaces in blast, a net loss of two during the month.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

	July 6, 1938	June 28, 1938	June 7, 1938	July 7, 1937
Per Gross Ton:				
Rails, heavy, at mill	\$42.50	\$42.50	\$42.50	\$42.50
Light rails, Pittsburgh	43.00	43.00	43.00	43.00
Rerolling billets, Pittsburgh	34.00	34.00	37.00	37.00
Sheet bars, Pittsburgh	34.00	34.00	37.00	37.00
Slabs, Pittsburgh	34.00	34.00	37.00	37.00
Forging billets, Pittsburgh	40.00	40.00	43.00	43.00
Wire rods, Nos. 4 and 5, P'gh	43.00	43.00	47.00	47.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.90	1.90	2.10	2.10

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.25	2.25	2.45	2.45
Bars, Chicago	2.25	2.25	2.50	2.50
Bars, Cleveland	2.25	2.30	2.50	2.50
Bars, New York	2.61	2.61	2.81	2.78
Plates, Pittsburgh	2.10	2.10	2.25	2.25
Plates, Chicago	2.10	2.10	2.30	2.30
Plates, New York	2.29	2.40	2.55	2.53
Structural shapes, P'gh	2.10	2.10	2.25	2.25
Structural shapes, Chicago	2.10	2.10	2.30	2.30
Structural shapes, New York	2.27	2.27	2.52	2.5025
Cold-finished bars, P'gh	2.70	2.90	2.90	2.90
Hot-rolled strips, P'gh	2.15	2.15	2.30	2.40
Cold-rolled strips, P'gh	2.95	2.95	3.10	3.20
Sheets, galv., No. 24, P'gh	3.50	3.50	3.80	3.80
Sheets, galv., No. 24, Gary	3.50	3.50	3.90	3.90
Hot-rolled sheets, P'gh	2.15	2.15	2.30	..
Hot-rolled sheets, Gary	2.15	2.15	2.40	..
Cold-rolled sheets, P'gh	3.20	3.20	3.35	..
Cold-rolled sheets, Gary	3.20	3.20	3.45	..
Wire nails, P'gh	2.45	2.45	2.75	2.75
Wire nails, Chicago dist. mill	2.45	2.45	2.80	2.80
Plain wire, Pittsburgh	2.60	2.60	2.90	2.90
Plain wire, Chicago dist. mill	2.60	2.60	2.95	2.95
Barbed wire, galv., P'gh	3.20	3.20	3.40	3.40
Barbed wire, galv., Chicago dist. mill	3.20	3.20	3.45	3.45
Tin plate, 100 lb. box, P'gh	\$5.35	\$5.35	\$5.35	\$5.35

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	July 6, 1938	June 28, 1938	June 7, 1938	July 7, 1937
No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.76
No. 2, Valley furnace	20.00	20.00	24.00	24.00
No. 2, Southern Cin'ti	20.16	20.16	23.89	23.69
No. 2, Birmingham†	16.38	16.38	20.38	20.38
No. 2, foundry, Chicago*	20.00	20.00	24.00	24.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	25.26
Basic, Valley furnace	19.50	19.50	23.50	23.50
Malleable, Chicago*	20.00	20.00	24.00	24.00
Malleable, Valley	20.00	20.00	24.00	24.00
L. S. charcoal, Chicago	28.34	30.34	30.34	30.04
Ferromanganese, seab'd car-				
lots	92.50	102.50	102.50	102.50

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Heavy melting steel, P'gh.	\$13.25	\$12.75	\$10.75	\$18.75
Heavy melting steel, Phila.	13.25	12.75	12.00	17.75	
Heavy melting steel, Ch'go.	11.25	10.75	10.25	15.75	
Carwheels, Chicago	12.50	12.50	12.00	18.25	
Carwheels, Philadelphia	14.75	14.75	14.75	19.75	
No. 1 cast, Pittsburgh	14.25	14.25	13.25	18.75	
No. 1 cast, Philadelphia	15.25	15.25	14.25	20.25	
No. 1 cast, Ch'go (net ton)	11.25	10.75	10.25	15.25	
No. 1 RR. wrot., Phila.	15.25	15.25	15.25	19.75	
No. 1 RR. wrot., Ch'go (net)	9.25	8.75	7.75	14.50	

Coke, Connellsville

Per Net Ton at Oven:	Furnace coke, prompt	\$3.75	\$3.75	\$4.00	\$4.35
Foundry coke, prompt	4.75	4.75	5.00	5.00	

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	9.75	9.00	9.00	14.00
Lake copper, New York	9.875	9.125	9.125	14.125
Tin (Straits), New York	43.625	42.25	38.75	59.875
Zinc, East St. Louis	4.75	4.50	4.00	6.75
Zinc, New York	5.14	4.89	4.39	7.10
Lead, St. Louis	4.75	4.35	3.85	5.85
Lead, New York	4.90	4.50	4.00	6.00
Antimony (Asiatic), N. Y.	14.00	14.00	13.75	14.12 1/2

The Iron Age Composite Prices

Finished Steel

July 6, 1938	2.300c. a Lb.
One week ago	2.350c.
One month ago	2.487c.
One year ago	2.512c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Pig Iron

\$19.61 a Gross Ton
21.91
23.25
23.25

Steel Scrap

\$12.58 a Gross Ton
12.08
11.00
17.42

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW			
2.512c., May 17; 2.300c., July 6	2.512c., Mar. 9; 2.249c., Jan. 4	2.249c., Dec. 28; 2.016c., Mar. 10	2.062c., Oct. 1; 2.056c., Jan. 8	2.118c., Apr. 24; 1.945c., Jan. 2	1.953c., Oct. 3; 1.792c., May 2	1.915c., Sept. 6; 1.870c., Mar. 15	1.981c., Jan. 13; 1.883c., Dec. 29	2.192c., Jan. 7; 1.962c., Dec. 9	2.223c., Apr. 2; 2.192c., Oct. 29	2.192c., Dec. 11; 2.142c., July 10	2.402c., Jan. 4; 2.212c., Nov. 1	\$23.25, June 21; \$19.61, July 6	23.25, Mar. 9; 20.25, Feb. 16	19.73, Nov. 24; 18.73, Aug. 11	18.84, Nov. 5; 17.83, May 14	17.90, May 1; 16.90, Jan. 27	16.90, Dec. 5; 13.56, Jan. 3	14.81, Jan. 5; 13.56, Dec. 6	15.90, Jan. 6; 14.79, Dec. 15	\$23.25, June 21; \$19.61, July 6	21.92, Mar. 30; 12.92, Nov. 16	
												22.25, Mar. 9; 20.25, Feb. 16	17.75, Dec. 21; 12.67, June 9	13.42, Dec. 10; 10.33, Apr. 23	13.00, Mar. 13; 9.50, Sept. 25	12.25, Aug. 8; 6.75, Jan. 3	8.50, Jan. 12; 6.43, July 5	11.33, Jan. 6; 8.50, Dec. 29	15.00, Feb. 18; 11.25, Dec. 9	17.58, Jan. 29; 14.08, Dec. 2	16.50, Dec. 31; 13.08, July 2	15.25, Jan. 17; 13.08, Nov. 22

...PITTSBURGH...

... Mills in central districts must absorb \$2 to \$3 additional freight to reach outlying districts . . . Full import of basing point changes will not be known at once . . . Steel scrap up 50c. a ton . . . Steel operations lower in Pittsburgh.

PITTSBURGH, July 6.—Owing to holiday shutdowns, the Pittsburgh district operating rate has receded 10 points from last week's revised figure of 26 per cent to 16 per cent this week but the Wheeling-Weirton district has advanced four points to 48 per cent.

Producers and consumers alike are seriously studying the apparent dislocating effects of last week's avalanche of new basing points and elimination of differentials between other points. A considerable time must elapse before the full import of these changes is realized, but at first glance it is fairly certain that Pittsburgh and nearby producers must absorb an additional \$2 or more a ton to reach certain points than heretofore and in some cases the absorption will run over \$3 a ton. At the moment producers in this district expect to service their customers in the same manner as heretofore.

Holiday and inventory influences, as well as price and basing point changes, have slowed up the volume of new business booked during the past few days. Nevertheless, orders in this district during June were 10 to 15 per cent ahead of those booked in May, and specifications during the week following the initial price announcements were fully as good as in the preceding week.

No. 1 heavy melting scrap is up 50c. a ton from last week, being quotable at \$13 to \$13.50 a ton.

Pig Iron

During the past week sales have been influenced somewhat by the holidays and to some extent by taking of inventory. Full effect on new business of the \$4 a ton reduction on pig iron will probably not be discernible for a few weeks.

Semi-Finished Steel

On a daily basis new business has been in slightly less volume than a week ago. Non-integrated makers of flat rolled products are digesting new prices. In some cases, notably where

basing point differentials have been eliminated on sheets and strip, the spread between finished products and semi-finished steel has been lowered. Some detached pipe mills are questioning the reduction of \$4 a ton on skelp while prices on standard pipe have been reduced \$8 a ton.

Bars, Plates and Shapes

Hot rolled bar business during the past week has been unimpressive owing to holiday and inventory influences. Whether or not lower prices will stimulate demand cannot be determined for a few weeks at least. Furthermore, the dislocating effects on the steel market caused by new basing points and elimination of differentials between other points will receive considerable study by consumers and producers alike before important commitments are made.

Reinforcing Bars

New concrete projects are almost entirely lacking and consumers and jobbers alike are studying the complex situation brought about by basing point price changes and additions. Producers in this district henceforth will absorb considerably more freight in reaching certain points than was the case heretofore.

Tin Plate

Tin plate operations this week are estimated at a shade over 35 per cent. Owing to the nature of contracts based on tin plate prices, no immediate change in current quotations is anticipated.

Sheets and Strip

Producers and consumers alike are scrutinizing closely additional basing points on flat rolled products and the elimination of differentials between other points as to the probable effect on their business. In addition to these conditions, holiday and inventory influences have also contributed in the comparative slowing up in new business.

Tubular Goods

Seamless tube producers have established a medium yield classification covering 12 leading oil-country goods casing items and 2, 2½ and 3 in. seamless oil well tubing. This new "B" classification covering the above products is priced \$7.50 a ton less than the "C" classification next above it. Meanwhile, oil-country goods business is in slightly better volume than a week ago owing to price clarifications.

Wire

Wire sales are in less volume than a week ago, although the drop is less than was anticipated in view of current events. A portion of the recent reductions on merchant wire products to some extent takes care of recent price cutting. On that portion of their stock purchases which are sold at wholesale, jobbers, upon their certification, will obtain an allowance from the base price of \$4 a ton on nails, staples, barbed wire and merchant galvanized and annealed wire and \$5 a ton on fence and bale ties. On direct shipment to dealers for resale made on a jobber's account discounts from the base price of \$2 a ton on carload lots and \$3 a ton on less carload lots are allowed.

. . . GREAT BRITAIN..

... British position grows worse . . . No revival expected before autumn.

LONDON, July 6 (By Cable).—The Continental steel market is still quiet, except for some business from Holland and Scandinavia.

The British position is growing worse as another blast furnace has been stopped and buyers are still unwilling to take up deliveries of materials purchased months ago. Producers consider that autumn will witness the earliest possible revival of demand.

Tees pig iron shipments from January to June were only 9000 tons against 50,000 tons a year ago.

Heavy steel makers now completing current contracts are seeking replacements.

Export business is negligible.

The tin plate market is quiet with unfilled orders around 2,000,000 base boxes. Inquiries are brisker but consumers are slow to follow commodity market rise.

Black and galvanized sheets are quiet.

• • • CHICAGO • • •

... Mills in Chicago area not expected to be greatly affected by basing point changes ... Ingot output lower, but may rebound next week ... Steel scrap 50c. higher.

CHICAGO, July 6.—Holiday shutdowns in district mills caused a three point loss in production to 24 per cent of capacity. Next week's operations are expected to exceed last week's mark of 27 per cent. A blast furnace was blown out July 2, only eight remaining in operation.

Producers and consumers alike are floundering about in a sea of uncertainty caused by the elimination of basing point differentials. Most of those contacted here believe their status will be little affected by the changes, which may bring about important alterations in other districts. Adequately fortified by a wide consuming territory, Chicago's huge steel mills, which turn out almost 20 per cent of the nation's theoretical capacity, under the new set-up are in a relatively good position.

Until such time as all mills have made their positions clear, few mills or customers will be able definitely to know where they stand with regard to the sale or purchase of steel products.

Orders are being received at about last week's rate, the reduction in prices as yet having had little effect, except upon pig iron sales, which are increasing at a good pace. Farm equipment buying will be less during July because of inventory shutdowns. Some advance buying for 1939 motor cars is expected soon. Railroad activity is confined to the shops, the Burlington putting men back to work at Aurora, Ill., and Havelock, Neb., and the Santa Fe lengthening the work week for 8000 shop employees over that system.

Cold rolled strip is now quoted at 3.05c., Chicago, by the Acme Steel Co. Keystone Steel & Wire Co., Peoria, has announced wire prices similar to those being quoted at Chicago, Cleveland and Pittsburgh. Peoria is not to become a basing point on wire products as some published reports have indicated.

International Harvester Co. has reduced prices of crawler type tractors 10 per cent and more.

Common iron bars have been reduced \$5 a ton to 2.15c., Chicago and Terre Haute.

The usual two point or \$4 a ton differential on pipe prices between Gary and Pittsburgh has been reduced to one point or \$2 a ton on all butt weld pipe 3 in. and smaller by one leading producer. Others are expected to rescind previous announcements and follow this lead.

Heavy melting steel is quoted 50c. a ton higher here this week at \$11 to \$11.50.

Pig Iron

The drastic reduction of \$4 a ton in pig iron prices has stimulated buying on third quarter contracts to a considerable degree, sellers here report. Shipments during June were sharply lower than those of May, however, and the trend in July and August is not expected to show much of an improvement. Foundry coke shipments are slightly above the first week of last month, the increased activity coming mostly from jobbing foundries. Sentiment in the trade is better, and much of the reluctance expressed all year to adding to inventories has disappeared.

Wire and Wire Products

Middle Western wire mills, all still operating on a Chicago base now equalized with Cleveland and Pittsburgh, see little change in store for them because of this price revision. Selling territories will for the most part remain about the same as heretofore, according to available opinion. Demand for merchant wire products is holding up well and is being extended over a longer period than usual. Little interest in manufacturing lines is expected over the summer, but a rise late in the third quarter and a sharp increase in the final period of the year is confidently anticipated.

Structural Shapes and Reinforcing Bars

Neither shape nor bar contracts have as yet received strength from the recent price reductions. Fabricators believe this condition will be alleviated when more jobs are available for quotation.

Sheets and Strip

Acme Steel Co. last week announced a Chicago base on cold rolled strip of 3.05c., 10c. per 100 lb. higher than

the Cleveland figure but a saving to Chicago consumers of 21c. because of the elimination of a 31c. freight charge. Adherence to a Chicago base of 2.15c. on hot rolled strip also was announced. Some small sheet orders for 1939 model advance die work have been received but no sizable orders or inquiries, except Buick's purchase and Ford's reported interest, have been mentioned.

Plates

Of chief interest to plate sellers is railroad activity and the return to work of 650 men at the Burlington's Aurora, Ill., shops and the increase of 8000 shop employees of the Santa Fe to a five-day week from three days a week. Demand currently is unimproved, however, deliveries being quoted from one week to 10 days.

Bars

Shutting down of some farm implement plants this month for taking inventory and reduction of stock is causing a slump in bar specifications.

• • • ST. LOUIS • • •

... Buying movement in pig iron follows \$4 a ton price reduction.

ST. LOUIS, July 5.—The \$4 a ton reduction in the price of pig iron was followed by the heaviest buying movement the trade has seen since the spring of 1937. There had been a feeling among melters that there would be some sort of a price decline, but they had no idea that the cut would be so sharp as it was. Recovering from their amazement, melters rushed in to cover their third quarter requirements, placing orders for from 100 to 2000 tons. Melters were imbued with the idea that the price would not go lower and might go higher, and so there was a disposition to order about twice the requirements for the next three months. It was this desire to hedge that was held responsible for a large part of the buying.

Reinforcing bar awarded include: 534 tons for a hospital at Springfield, Ill., to Missouri Rolling Mills Corp., St. Louis, and 234 tons for a highway bridge at Bixby, Okla., to Patterson Steel Co., Tulsa, Okla. New projects requiring structural shapes: 600 tons for the Blue River bridge for the Kansas City (Mo.) Terminal Railway and 700 tons for a building for the American Refrigerator Transit Co. at St. Louis.

..BIRMINGHAM..

... Market slow in responding to new base prices in the South . . . Cast iron pressure pipe reduced \$4 a ton.

BIRMINGHAM, July 5.—The change in the basing point system for steel was so sudden and unexpected that the market has been slow in responding to the new policy and new prices. There has been a moderate increase in orders for sheets and wire products but bar, plate and structural demand has not yet improved and new tonnage is still limited. Most buyers seem to be marking time so as to find out the full effects of the new Birmingham base. Steel producers are confident that a steady upward trend may be anticipated and they are looking forward to an active market in the fall.

There has been a little more life in the pig iron market since a reduction of \$4 a ton was announced on June 25, but melters are not yet rushing into the market, and are still buying close to current requirements.

On Wednesday, June 29, following the reduction in steel and pig iron prices, Birmingham pressure pipe manufacturers announced a cut of \$4 a ton.

Seaboard Air Line Railway announced last week that it had bought 4500 tons of rails from the Tennessee Coal, Iron & Railroad Co. Inquiries develop that this rail was rolled before the Ensley rail mill was closed last month and the order does not indicate an early resumption of the mill.

There was a slight increase in steel production last week when an extra open-hearth unit was fired at Fairfield. Eleven open hearths were operated in the district last week and the same number will operate this week. Five are at Fairfield, two at Ensley and four at Gadsden.

The blast furnace total is unchanged and consists of five active stacks. The Tennessee company is operating one at Fairfield and one at Ensley; Woodward Iron Co., one at Woodward; Republic Steel Corp., one at Thomas; Sloss-Sheffield Steel & Iron Co., one at Thomas. Republic Steel Corp. is reported as planning to blow in its Gadsden furnace some time this month.

Price reductions on merchant and manufacturing wire and wire products were announced June 28 by the Tennessee Coal, Iron & R.R. Co. These

range from \$5 to \$8 per net ton. Prices of these products in the Birmingham area are now identical with the mill prices of the American Steel & Wire Co. for like products at Cleveland, Pittsburgh and Chicago.

The Alabama Highway Department will open bids July 8 for constructing the structural steel superstructure for the new bridge across the Tennessee River between Florence and Sheffield. This project is to cost in excess of \$1,500,000.

....BUFFALO....

... Pig iron sales improve following \$4 cut . . . steel operations higher.

BUFFALO, July 6.—While mills feel that it is early to gage the effect of the recent price changes and the new system of basing prices, they report that the general customer response has been favorable. It is apparent that Buffalo and nearby district consumers should benefit in the purchase of steel commodities manufactured in Buffalo, and most producers believe an impetus to business will result. More automotive business, some observers think, may come here.

Practically coincident with the price adjustment, increased operations have occurred, with Bethlehem's Lackawanna plant now operating 11 open hearths as against nine last week. Republic Steel Corp. is continuing to operate two and Wickwire-Spencer Steel Co. has temporarily discontinued its one active open hearth but expects to charge again within a few days.

A new price for galvanized sheets, 24 gage, Buffalo base, is 3.50c. with switching charge additional.

Pig iron buyers have given the wide break in that market an active welcome, with sharp increases of business noted. At the new prices, \$4 below previous figures, considerable buying has resulted, although some caution as to tonnage is apparent, in view of the uncertainty as to real needs. Notwithstanding, several 1000-ton lots of foundry and malleable are coming out in contrast to the carload demand heretofore.

Prices of silvery pig iron has been reduced \$4 per ton in conformity with the other cuts.

A new schedule of warehouse prices has been announced for Buffalo, with new quantity differentials as follows:

Galvanized sheets, broken bundles, plus \$1.35; 150 lb. to 499 lb., plus 35c.; 500 lb. to 1499 lb., base 4.40c.; 1500 lb. to 3499 lb., minus 20c.; 3500 lb. to 6999 lb., minus 30c. Hot-rolled quantity differentials: less than 100 lb., plus \$1.50; 100 to 399 lb., plus 50c.; 400 to 1999 lb., base; 2000 to 9999 lb., minus 20c.; 10,000 to 39,999 lb., minus 30c.; 40,000 lb. and over, minus 40c.

Lacking in the new warehouse price schedule but expected to come out this week are new prices on common wire nails and wire.

The 1060 tons of fabricated structural steel required for the new Wickwire-Spencer wire mill was awarded to the Truscon Steel Co., Buffalo. An award of 175,000 sq. ft. of steel roof decking for the same job also went to the Truscon Steel Co.

...CINCINNATI...

... Middletown base established on hot and cold rolled strip and galvanized sheets.

CINCINNATI, July 6.—While district sheet producers say they will meet competition on the basis of recent price reductions in other areas, the effect of the new price structure is not yet ascertainable. A Middletown, Ohio, base has been announced by American Rolling Mill Co. on hot and cold rolled sheets, on hot rolled strip and galvanized sheets. Meanwhile, current ordering remains on an even keel. No stimulus has yet been noticeable from the new price set-up. Mill schedules for this week have been revised to permit rolling of rush shipments, with the repair shutdown advanced to later in the summer.

Production of ingots will be more than doubled this week over last. Eight furnaces of two interests that have been idle for the past two weeks will be reheated. Fourteen out of 34 open hearths will be in operation this week as against six the preceding period.

Northern pig iron producers followed the Southern furnaces the past week in reducing prices \$4 a ton. The new foundry iron delivered price at Cincinnati is now \$20.44, with corresponding changes on other analyses. The change was so sudden, that no effect on demand has yet been noticed. A few foundries report a slightly improved demand for castings, which will probably be reflected for a short period in a moderate increase in the melt.

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... NEW YORK ...

... Steel business dull as buyers digest recent changes in prices and basing point . . . East may benefit industrially.

NEW YORK, July 6.—Steel business has virtually stagnated in this market while consumers are digesting the changes that have been brought about in pricing arrangements during the past 10 days. The holiday influence probably was a further factor in restricting purchases. It is not believed that this situation will last long as in due time buyers probably will recognize that the new delivered prices afford them as much of a reduction as they could reasonably hope to obtain, even if wages are reduced.

Mills and buyers are watching closely to see whether the new prices hold, but even if further weakness developed it probably would be only temporary in view of the large losses which the mills are already absorbing.

The East is expected to benefit industrially from the changes, particularly because of Eastern basing points for the first time on sheets and strip products which are used in large volume along the Atlantic Seaboard.

Steel companies whose mills are situated in the central district will be obliged to absorb large amounts of freight to meet delivered prices of products on which Eastern basing points have recently been established, but, as the New York territory supplies a substantial tonnage, there is little likelihood that mills situated at a distance will relinquish established trade here even if the business is taken at a loss for the time being.

Pig Iron

With the short holiday week following so closely upon the heels of last week's price reductions, sufficient time has not elapsed to permit an accurate appraisal of the effects of the price changes, and the market is, consequently, marking time, with very little iron being purchased. Foundry activity continues at low levels, with many plants shut down for the entire holiday week. The new delivered prices for No. 2 iron at Jersey City is \$22.53, while the bessemer grade is now quoted at \$23.53 at the same delivery point. Low phosphorus iron has been lowered \$3 a ton to a base of \$25.50 at Birdsboro and Steelton, Pa., and Standish, N. Y. Basing

points remain the same as heretofore. Chateaugay Ore & Iron Co. has blown in its blast furnace at Standish, N. Y., for a short run of about a month to make up a shortage.

Reinforcing Bars

The establishing of Sparrows Point as a basing point on reinforcing bars for this district has resulted in a reduction of 12c. per 100 lb. in freight charges, making the present delivered price in the Metropolitan district 2.34c., including 5c. per 100 lb. for trucking. The Pittsburgh-Jersey City rate is 36c., as compared with a 24c. rate from Sparrows Point. This price, however, has shown some weakness, as some recent tonnages were sold slightly below this quotation.

Plates and Sheets

With all sellers meeting the competition of the nearest f.o.b. point, delivered prices on plates in New York have been changing almost daily in the past week. As first Sparrows Point, then Coatesville and finally Claymont, Del., became basing points at 2.10c., the former Pittsburgh freight differential was cut from 36c. to 19c., making the delivered carlot price, New York, 2.29c. Meanwhile, most buyers have been withholding commitments until the situation is stabilized, although tank fabricators took a few hundred tons for immediate needs on the basis of price prevailing at time of shipment.

Action is shortly expected on the 30 scows for the Department of Sanitation. A PWA grant of about \$600,000 has been made to the city, and the Board of Estimate on Monday voted the city's share of \$852,500. It is expected that three local yards will share in the award, since the scows must be delivered by Jan. 1 and no one yard has the capacity for turning out this many barges in less than six months.

Most sheet sellers report business at a standstill, although one seller reported a healthy batch of orders in Monday's mail. Some substantial inquiries are out, but some believe that large consumers with scattered plants are merely testing the new basing points for minimum delivered prices.

... SAN FRANCISCO...

... Inland Steel Co. awarded 11,000 tons of piling.

SAN FRANCISCO, July 5.—The United States Engineer, Los Angeles, has awarded 11,000 tons of sheet piling to Inland Steel Co. Identical bids on the piling, which will be used for flood control work, had been submitted by Columbia Steel Co. and Bethlehem Steel Co.

Plate fabricators' attention has been centered on the opening of bids on 2200 to 2800 tons of large diameter pipe for the Greater Vancouver Water District, Vancouver, B. C., and on 3000 tons of steel plate penstocks for Grand Coulee Dam. The penstock tonnage is substantially larger than originally estimated. The Los Angeles Department of Water and Power has made application to the PWA for a loan and grant to cover construction in Mono Basin and distribution facilities in and near Los Angeles which will require a very large tonnage of fabricated steel pipe. This project should not be confused with the Metropolitan Water District, Los Angeles, aqueduct which will also require a sizable tonnage within the next few months.

Partially due to the entrance of a new interest into the market, and partially due to other factors, the reinforcing bar price structure in Northern California appears to be headed for a shakedown.

CANADA

... Demand for steel is fairly steady.

TORONTO, July 6.—No large steel contracts have been reported for several weeks although it is stated that some good orders are pending, chiefly in structural steel. Orders also are expected soon from Britain for airplanes and munitions. Domestic demand for both iron and steel is fairly steady, showing only minor change from week to week.

Merchant pig iron sales showed a decline during the week. Melters are in the market for small lots for spot needs, and orders ranging from a car to 300 or 400 tons are reported. A number of melters have closed contracts for third quarter and it is stated that this business is slightly in excess of that for last quarter.

... CLEVELAND ...

... Changes in steel price structure expected to have many ramifications ... Cleveland and Youngstown are bases on plates, Youngstown on sheets ... Operations lower this week.

CLEVELAND, July 6.—Essential outlines for the new picture have been supplied by price announcements from the major independent producers, but the ramifications which will result from the abandonment of base price differentials are so far flung that producers and consumers alike still are confounded. Under close scrutiny are locations and costs and the necessity for obtaining the cheapest transportation possible. Decisions on these factors by individual producers may lead to important moves ultimately.

Steel producers have a lesser return through increased absorption, and some consumers face possible changed competitive situations over the long term. The realignment may be effected slowly, due to unwillingness to let any business fall by the wayside right now, if at all preventable.

Indicative of the new trend, Ohio within a few days has been portioned off at Cleveland, Middletown and Youngstown for flat-rolled products. Each of these backyards is now more costly for outside producers to reach, and in turn the mills at these centers will have a lesser return on tonnage sold in other districts.

The first half has closed with orders improved for certain products. Sheet and strip sales in June topped all previous months this year here, due to general requirements and buying of galvanized sheets. Pig iron orders have picked up quickly during the last few days, following the \$4 per ton reduction, which is one of the deepest on record.

Reflecting the holiday shut-down, ingot output this week for Youngstown and nearby cities is off one point to 21 per cent. At Cleveland several open hearths which shut down last Saturday will remain off all week, and thus the Cleveland-Lorain average is down 10 points to 12 per cent.

Pig Iron

The \$16 Birmingham price has brought out some business already, and the same is true in Ohio and Indiana. Buyers were quick to realize the

attractive new price results from one of the deepest reductions on record. Since the differential with scrap has dropped \$6 in a short time, iron sellers are hopeful that at least a return to normal mixtures will be started. June iron shipments were about on a par with May. At Jackson, Ohio, prices were reduced \$4 per ton and silicon differentials revised.

Sheets and Strip

With Youngstown, Middletown and Cleveland bases established, interest centers upon whether some of the smaller producing points might take similar action. Youngstown has been named base on hot and cold rolled sheets, hot and cold rolled strip steel, commodity strip, galvanized sheets and enameling sheets. Lowering of the Detroit arbitrary means more absorption, but still not as much as if Detroit had been made a basing point. Incoming business in June was up sharply, making the month the best so far this year, due to strong demand for galvanized sheets and general requirements. Cold rolled spring steel, 0.26 to 0.50, is 2.95c, Pittsburgh and Cleveland.

Bolts, Nuts and Rivets

Full finished cap screw discounts have been revised, the consumer price for hexagon head, fine or coarse thread, S.A.E. or U.S.S., now being 70 and 10 and 10 per cent off; square head, 50 per cent off; fillisters, 62.5 and 10 and 5 per cent off; flats, 55 and 10 per cent off; buttons, 25 and 10 per cent off. Other bolt and nut revisions are expected momentarily.

Tubular Goods

Classifications have been revised in oil country casing, grade B, which includes the 12 leading casing items, being \$7.50 a ton below grade C.

Plates, Shapes and Bars

In these products, new basing points include Cleveland and Youngstown on plates. Structural projects continue numerous, with bids due soon on the new Timken high school at Canton,

and the cloverleaf intersection in Cuyahoga County. Bethlehem Steel Co. is low bidder on the third Akron standpipe, involving 300 tons of plates.

Warehouse Business

Warehouses here have revised their price lists in line with lower mill quotations.

Wire and Wire Products

Speculation over possible new basing points is the principal topic of discussion. Differentials at Worcester are being maintained. The reductions have been established for the numerous minor specialties. Bookings of merchants' and manufacturers' wire are described as being satisfactory recently, particularly from the Middle West.

Iron Ore

Estimates of the probable total movement for the current season are being revised downward, and now some persons believe the final figure will be somewhere between 15,000,000 and 20,000,000 tons. Shipments from upper Lake ports in June totaled 2,837,745 gross tons, a decrease of 7,270,138 tons from June, 1937. The cumulative total for the season to July 1 is 4,278,962 tons, against 23,922,294 tons to the same date last year.

... BOSTON ...

... Pig iron price cut of \$4 fails to stimulate buying.

BOSTON, July 5.—The Mystic Iron Works cut pig iron prices \$4 a ton on Wednesday, June 29. Other domestic furnaces serving New England as well as Indian iron interests have taken similar action. This abrupt drop in prices so far has failed to stimulate business. Furnace interests with unfilled contracts have adjusted them to the new prices. Foundries generally say the price cut is the most unsatisfactory thing that has happened in years. Their clients are clamoring for lower prices for castings on order, and the foundry industry is very unsettled as a result.

The reduction of \$4 a ton on cast iron pipe prices to \$46 a ton, f.o.b. foundry, will not work a hardship on makers due to reduced raw material prices. Pipe makers report business prospects as much brighter, and releases on old contracts coming in rapidly.

The steel mill products price situation is still very much confused.

.. PHILADELPHIA ..

... Buying at a standstill as consumers and mills examine drastic price realinement ... Mills firm in belief that wages will have to come down or base quotations advance in near future ... Scrap continues to ride bullish wave.

PHILADELPHIA, July 6.—Practically every consumer has gone under cover until the current price confusion settles, the result being that the week's bookings have been nil. Thus, operators naturally took advantage of the holiday to cut operations—the district average for the week being 19 per cent—and even with current reduced open hearth activity there are ingot piles building up moderately at more than one district plant. However, within two weeks this situation will probably reverse as consumers start coming in to take advantage of the very low prices now publicly available.

Since prices are the main subject of conversation, additional clarification here is in order. Popular opinion to the contrary, the new quotations do not represent actually a drastic decline; for prices on many products were quietly suffering to an equal or even greater extent before the public announcement. Furthermore, contrary to popular opinion, the basing point system has not gone by the board, but rather has been amplified somewhat to give consumers close to certain mills a considerably lower price on the mill's products. Furthermore, the net result of all the change will not be to localize a certain mill's business much more than it has been in the past; for mills will continue to go into other territories on a competitive basis by absorbing a greater freight loss. The net result of all these shifts therefore has been that consumers are publicly afforded quite sizable price reductions, the entire steel pricing system has been increased in complexity, and all mills are taking a serious price beating to a more or less degree. Therefore, all mills are firmly convinced that as hysteria wanes in the near future, a labor rate decline or price change upward will be inevitable if any of them are to show even a little black ink in the lower right hand corner of the ledger.

Now that the basing point shifts have about run their course, it should be noted that on plates Coatesville, Claymont and Sparrows Point have

all announced a 2.10c. base, with Claymont ruling the immediate Philadelphia area on a 5c. freight rate. On shapes, Bethlehem is the governing base at 2.10c. and a rate of 11.5c. On hot rolled sheets the Sparrows Point base rules Philadelphia with a 2.15c. base and a 17c. freight rate. On cold rolled sheets Philadelphia will work on a Pittsburgh base of 3.20c. and a freight rate of 32c. On bars, strip and floor plates the Pittsburgh base will blanket this territory. Rerolling billets will be based at Sparrows Point at \$34, and forging billets will base at Pittsburgh at \$40. Swedeland continues to be the base for foundry pig iron here, with a Philadelphia delivered price now of \$21.84, representing a \$4 decline.

..CAST IRON PIPE..

Boston has awarded 2940 ft. of 8-in. and 4330 ft. of 12-in. pipe to United States Pipe & Foundry Co.

Lynn, Mass., is in the market for 2500 ft. of cement lined or 6-in. unlined steel pipe, bids to be received at city clerk's office.

Malden, Mass., has awarded 200 tons of 6 to 12-in. pipe to United States Pipe & Foundry Co. A low bid submitted by French interests was rejected.

Washington Suburban Sanitary Commission, Tower Building, Washington, plans pipe lines for water system in Bradley Heights district. Fund of \$114,500 has been secured through Federal aid for this and other waterworks installation in that area.

Watervliet, N. Y., plans about 15,000 lin. ft. of 24-in. for main water line; also new 1,000,000-gal. concrete reservoir and other waterworks installation. Cost about \$165,000. Financing is being arranged through Federal aid. Solomon & Keis, 257 Broadway, Troy, N. Y., are consulting engineers.

Indianapolis Water Co., Indianapolis, plans pipe line extensions and replacements in water system; also additions in Fall Creek pumping station on Keystone Avenue, with installation of new pumping machinery, water-treatment and other equipment, cost about \$515,000. New elevated steel tank and other waterworks equipment will be installed in Blue Ridge district to cost about \$250,000. W. C. Mabee is chief engineer.

Chetopa, Kan., plans pipe lines for water system and other waterworks installation. Cost, about \$50,000, of which \$28,000 will be represented by bond issue and remainder through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Undoubtedly the most significant development of the base price changes in the East is that the northern New Jersey and New York market, probably the most lucrative in the country, has been lost to Pittsburgh on many important products and now comes under the jurisdiction of Buffalo producers, i.e., Pittsburgh will have to absorb more freight loss than Buffalo. To illustrate, cold rolled sheets and bars are based at the same level at Pittsburgh and Buffalo, and the freight rates from these points to various consuming centers from Philadelphia to points north up to New York are as follows:

	From Pittsburgh	From Buffalo
To Philadelphia ..	32c.	34c.
To Trenton	33c.	34c.
To New Brunswick	35c.	33c.
To Newark	36c.	34c.
To New York....	36c.	34c.

It is thus obvious that up to some point between Trenton and New Brunswick the Pittsburgh base will have the freight advantage, whereas points north, including the large metropolitan New York area, will give the freight advantage to Buffalo.

Surfside, Fla., plans pipe line extensions in water system and other waterworks installation. Fund of \$45,450 has been secured through Federal aid. Charles G. Hannock is engineer in charge.

Amherst, Wis., plans pipe lines for water system and other waterworks installation. Fund of \$80,000 is being arranged through Federal aid for this and sewer system. A. E. McMahon Engineering Co., Menasha, Wis., is consulting engineer.

Grundy, Va., plans pipe lines for water system and other waterworks installation. Fund of \$50,000 is being secured through Federal aid. J. B. McCrary Engineering Corp., Journal Arcade Building, Knoxville, Tenn., is consulting engineer.

Glenwood, Ind., plans pipe lines for water system and other waterworks installation, including 60,000 to 75,000-gal. elevated steel tank and tower. Estimates of cost are being made and financing will be arranged through Federal aid. Frank Cameron is member of town board in charge. Cost, \$40,000.

Creedmoor, N. C., will take bids soon for 2 to 6-in. pipe for water system; also for 100,000-gal. elevated steel tank on 100-ft. steel tower and other waterworks installation. J. B. McCrary Co., Bona Allen Building, Atlanta, Ga., is consulting engineer.

Braymer, Mo., plans pipe lines for water system and other waterworks installation. Cost about \$66,000. Financing is being arranged through Federal grant and loan. J. W. Shikles & Co., New York Life Building, Kansas City, Mo., are consulting engineers.

Amboy, Ill., plans pipe lines for water system and other waterworks equipment. Fund of \$38,182 has been secured through Federal aid. Work is scheduled to begin soon.

Ethel, Miss., plans pipe lines for water system and other waterworks installation. Cost about \$30,000. Financing is being arranged through Federal aid. A. S. Brumby, Starkville, Miss., is consulting engineer.

FABRICATED STEEL

NORTH ATLANTIC STATES AWARDS

3000 Tons, Queens, N. Y., Cross Bay Parkway bridge, contract 3, to American Bridge Co., Pittsburgh; Johnson, Drake & Piper, Inc., Freeport, N. Y., general contractor.

2975 Tons, New York, hangars at North Beach Airport for Procurement Division of Treasury Department, to Bethlehem Steel Co., Bethlehem, Pa.

1075 Tons, Tonawanda, N. Y., mill building for Wickwire Spencer Steel Co., to Truscon Steel Co., Youngstown, Ohio; John W. Cowper, Buffalo, general contractor.

306 Tons, Washington, lookout towers for Department of Agriculture, to International Derrick & Equipment Co., Columbus, Ohio.

265 Tons, New York, addition to Bonwit-Teller store, 7 East 56th Street, to Harris Structural Steel Co., Plainfield, N. J.; William Crawford, Inc., New York, general contractor.

250 Tons, Brooklyn, Water Street Garage, to Levinson Steel Co., Pittsburgh.

250 Tons, Steuben County, N. Y., State highway bridge, to American Bridge Co., Pittsburgh, Hornell Construction Co., Hornell, N. Y., general contractor.

250 Tons, Shelton, Conn., State Hospital Nurses' Home, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

230 Tons, New London, Conn., Connecticut College auditorium, to Haarman Steel Co., Holyoke, Mass.; A. F. Peaslee, Inc., general contractor.

175 Tons, Philadelphia, Horn & Hardart restaurant, to Belmont Iron Wks.

165 Tons, North Tonawanda, N. Y., building for General Plastics Co., to R. S. McMannus Steel Construction Co., Buffalo; George W. Morris, general contractor.

125 Tons, Buffalo, sub-station for Buffalo General Electric Co., to Bethlehem Steel Co., Buffalo.

125 Tons, towers for Buffalo General Electric Co., to Lackawanna Steel Construction Corp., Buffalo.

120 Tons, Annapolis, Md.; museum for Naval Academy, to Fort Pitt Bridge Works Co., Pittsburgh.

THE SOUTH

1545 Tons, Tulsa County, Okla., bridge, to Patterson Steel Co., Tulsa, Okla.; Guy H. James, Oklahoma City, general contractor.

705 Tons, Rabun County, Ga., bridge, to Virginia Bridge Co., Roanoke, Va.

535 Tons, Durham, N. C., Duke University dormitories, to Southern Engineering Co., Charlotte, N. C.

340 Tons, Johnson and Dallas Counties, Tex., bridges, to Mosher Steel Co., Dallas, Tex.

220 Tons, Kimble County, Tex., bridge; to North Texas Iron & Steel Co., Fort Worth, Tex.; Purvis & Bertram, Fort Worth, general contractor.

180 Tons, Williamsburg, Va., The Lodge, to Richmond Steel Co., Richmond, Va.

175 Tons, Cynthiana, Ky., State bridge over Licking River, to American Bridge Co., Pittsburgh.

155 Tons, Dallas County, Tex., bridge, to Virginia Bridge Co., Roanoke, Va.; John F. Buckner, Cleburne, Tex., contractor.

150 Tons, Hinds and Rankin Counties, Miss., bridge, to Virginia Bridge Co., Roanoke, Va.; Keliber Construction Co., general contractor.

110 Tons, Brooks County, Ga., bridge, to Taylor Iron Works & Supply Co., Macon, Ga.; Coffee Construction Co., general contractor.

CENTRAL STATES

565 Tons, Wauwatosa, Wis., high school, to Worden-Allen Co., Milwaukee.

400 Tons, Bureau, Ill., Rock Island bridge, to American Bridge Co., Pittsburgh, through List & Weatherby, Kansas City.

400 Tons, Linn County, Kan., bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.; Maxwell Construction Co., general contractor.

390 Tons, Hammond Spring, Ind., forge and ship buildings, to American Bridge Co., Pittsburgh; A. J. T. Bennett, Jr., general contractor.

135 Tons, Moville, Iowa, State bridge, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

130 Tons, Chicago, Englewood post office, to Joseph T. Ryerson & Son, Inc., Chicago; Henke Construction Co., general contractor.

110 Tons, Burlington, Iowa, Industrial Arts School, to Des Moines Steel Co., Des Moines, Iowa.

100 Tons, Painesville, Ohio, power plant, to Rogers Structural Steel Co., Corry, Pa.; DeHamel Construction Co., Cleveland, general contractor.

WESTERN STATES

1025 Tons, Grand Coulee Dam, Wash., stop log guides, to A. J. O'Leary & Son, Chicago.

350 Tons, Austin, Colo., State bridges PWA-409-B, to Midwest Steel & Iron Works, Denver.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

5250 Tons, North Bergen, N. J., approach, Prospect Avenue and route 3, Lincoln Tunnel; contract MHT-74; bids by Port of New York Authority until July 19.

2500 Tons, Brooklyn, subway, route 110, section 6-A.

1200 Tons, New York, garage for Omnibus Corp.

1100 Tons, New York, section of West Side elevated highway; bids by president, Borough of Manhattan, until July 15.

550 Tons, White Plains, N. Y., hospital, Hartridge Co., Inc., New York, general contractor; erroneously reported as awarded to Lehigh Structural Steel Co., New York, in issue of June 30.

500 Tons, New York, bridge over William F. Deegan Boulevard.

250 Tons, Jersey City, N. J., crane runway, Schiavona-Bonomo Corp.

225 Tons, Sparrows Point, Md., building for Wilson Welder & Metals Co.; bids being taken.

150 Tons, Brooklyn, welding shop for Navy Department.

REINFORCING STEEL

AWARDS

534 Tons, Springfield, Ill., hospital, to Missouri Rolling Mills Corp., St. Louis.

234 Tons, Bixby, Okla., highway bridge, to Patterson Steel Co., Tulsa, Okla.

175,000 Sq. Ft. of steel roofdecking, Tonawanda, N. Y., mill building for Wickwire Spencer Steel Co., to Truscon Steel Co., Youngstown.

159 Tons, Chicago, Englewood post office, to Calumet Steel Co., Chicago.

150 Tons, Canton-Simsbury, Conn., bridge, to Truscon Steel Co., Youngstown; A. I. Savin Construction Co., contractor.

145 Tons, Knoxville, Iowa, Veterans' building, to Joseph T. Ryerson & Son, Inc., through John E. Ericsson, Chicago.

NEW REINFORCING BAR PROJECTS

15,000 Tons, New York, housing project in Bronx of Metropolitan Life Insurance Co. Alternate plan calls for 1500 tons of mesh. Starrett Bros. & Eken, N. Y., contractors.

1300 Tons, Brooklyn, substructure, Meeker Avenue bridge, Reiss & Weinsier, Inc., Brooklyn, low on rebidding.

250 Tons, Canton, Ohio, Timken Technical High School, bids July 18.

250 Tons, Panama Canal Zone, Schedule 3364; bids July 8 to General Purchasing Officer, Washington.

150 Tons, Chicago, Ware Bros. factory.

145 Tons, Calexico, Cal., All-American Canal (Invitation B-42086-A); bids opened.

129 Tons, Los Banos, Cal., San Joaquin River highway bridge; bids July 20.

120 Tons, Tilton, Wis., subway.

103 Tons, Lompoc, Cal., Santa Ynez River highway bridge; bids July 20.

100 Tons, Schoolcraft, Mich., bridge.

100 Tons, Kankakee, Ill., bridge.

100 Tons, Janesville, Wis., post office.

100 Tons, Whitefish Bay, Wis., church.

100 Tons, Shelton, Conn., State infirmary.

100 Tons, Meriden, Conn., administration building, infirmary and school.

THE SOUTH

1500 Tons, New Orleans, State bridge over New Basin Canal; bids in.

325 Tons, Dermott, Ark., bridge.

200 Tons, Fayette County, Ky., grade school.

200 Tons, Pondcreek, Okla., Rock Island bridge; bids in.

120 Tons, La Grange, Ky., State prison buildings.

CENTRAL STATES

2400 Tons, State of Illinois, viaduct over Burlington tracks, Ogden and Cicero, Chicago; bids July 22.

1200 Tons, Canton, Ohio, Timken Technical High School; bids July 18.

1300 Tons, Cleveland, State elevated Cloverleaf highway intersection near Independence; bids July 22.

700 Tons, St. Louis building for American Refrigerator Transit division of Missouri Pacific Railway.

600 Tons, Kansas City, Mo., Blue River bridge for Kansas City Terminal Railway.

400 Tons, Manchester, Iowa, State plate girder bridge, F-4-E.

200 Tons, Marquette County, Mich., 11 bridge decks, United States Treasury Department.

125 Tons, Ozaukee County, Wis., Tillman subway; bids July 12.

300 Tons, Mauston, Wis., bridge.

125 Tons, Saukville, Wis., bridge; bids July 12.

WESTERN STATES

700 Tons, Bremerton, Wash., building, Puget Sound Navy Yard.

139 Tons, Lompoc, Cal., Santa Ynez River highway bridge; bids July 20.

FABRICATED PLATES

AWARDS

310 Tons, Akron, Ohio, standpipe No. 3, to Bethlehem Steel Co., Bethlehem, Pa.

SHEET PILING

AWARDS

11,000 Tons, Los Angeles and vicinity, flood control work by United States Engineer, to Inland Steel Co., Chicago.

1500 Tons, Queens, N. Y., Bowery Bay bulkhead, to Bethlehem Steel Co., Bethlehem, Pa.

NEW PROJECTS

179 Tons, Odair, Wash., Columbia basin project (Invitation A-38100-A); bids opened.

128 Tons, Knob, Cal., Bureau of Reclamation (Invitation B-42081-A); bids July 8.

NON-FERROUS

Copper consumers buy heavily as prices move up to 9.75c. . . . Lead quotations lifted to 4.90c., New York, as demand exceeds intake . . . Professional interest only sign of activity in tin market.

NEW YORK, July 6.—The revived interest of consumers in all the major non-ferrous metals but tin was evidenced by the large volume of sales in the past week. The fact that consuming activity has shown no improvement comparable to the gain in sales would indicate that buyers are taking a long view and feel that present prices are "cheap." Copper sales in June, bolstered by the heavy buying in the last few days of the month, amounted to about 91,000 tons, the heaviest since December, 1936. Sales on Friday and Saturday reached the unusual total of

65,483 tons. While fabricating interests affiliated with producers have played the major role in swelling the sales totals, independent consumers have also, for the first time in many months, been extremely active. On Thursday prices were split with one producer quoting 9.25c. and the rest of the trade quoting 9c. On Friday, however, all sellers adopted the 9.25c. level. Additional increases on Saturday and Tuesday make the present price 9.75c. per lb., Connecticut Valley, for electrolytic metal. Sales abroad have been in the neighborhood of 1500 tons a day, at prices that have been

The Week's Prices. Cents Per Pound for Early Delivery

	June 29	June 30	July 1	July 2	July 5	July 6
Electrolytic copper, Conn.*	9.00	9.125	9.25	9.50	9.75	9.75
Lake copper, N. Y.	9.125	9.25	9.375	9.625	9.987	9.875
Straits tin, spot, New York	42.60	43.00	43.125	43.50	43.625	
Zinc, East St. Louis	4.50	4.50	4.75	4.75	4.75	4.75
Zinc, New York	4.89	4.89	5.14	5.14	5.14	5.14
Lead, St. Louis	4.35	4.60	4.60	4.60	4.60	4.75
Lead, New York	4.50	4.75	4.75	4.75	4.75	4.90

*Delivered Connecticut Valley; price 1/4c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.00c. a lb., prompt, f.o.b., New York.
Antimony, American, 11.25c. per lb., prompt shipment, New York.
Quicksilver, \$82.00 per flask of 76 lb.

Brass ingots, commercial 85-5-5-5, 10.25c. a lb., less carload, delivered in Middle West

1/4c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	45.00c. to 46.00c.
Tin, bar	47.00c. to 48.00c.
Copper, Lake	10.50c. to 11.50c.
Copper, electrolytic	10.50c. to 11.50c.
Copper, castings	10.00c. to 10.25c.
*Copper sheets, hot-rolled	17.625c.
*High brass sheets	16.125c.
*Seamless brass tubes	18.875c.
*Seamless copper tubes	18.125c.
*Brass rods	12.125c.
Zinc, slabs	6.00c. to 7.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.50c.
Lead, American pig	5.50c. to 6.50c.
Lead, bar	6.25c. to 6.625c.
Lead, sheets, cut	7.75c.
Antimony, Asiatic	15.25c. to 16.25c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, 1/2 and 1/2	29.00c. to 30.00c.
Babbitt metal, commercial grade	20.00c. to 50.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	47.75c.
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Tin, bar	47.75c.
Copper, Lake	10.75c. to 11.00c.
Copper, electrolytic	10.75c. to 11.00c.
Copper, castings	10.50c.
Zinc, slabs	7.50c. to 7.75c.
Lead, American pig	5.25c. to 5.50c.
Lead, bar	8.50c.
Antimony, Asiatic	17.75c. to 18.00c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	51.75c.
Solder, 1/2 and 1/2	28.50c.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.00c.	7.75c.
Copper, hvy. and wire	6.125c.	6.625c.
Copper, light and bottoms	5.625c.	5.875c.
Brass, heavy	3.75c.	4.25c.
Brass, light	2.75c.	3.50c.
Hvy. machine composition	5.625c.	7.125c.
No. 1 yel. brass turnings	3.50c.	4.50c.
No. 1 red brass or compositions, turnings	5.25c.	5.75c.
Lead, heavy	3.25c.	3.625c.
Cast aluminum	5.00c.	6.25c.
Sheet aluminum	9.00c.	10.50c.
Zinc	2.00c.	3.25c.

moving up slowly in sympathy with the situation here. This morning's equivalent was 9.95c. per lb., c.i.f., usual base ports.

Zinc

Sales of prime Western in the past week amounted to 6317 tons and deliveries were 3872 tons. While the week's sales were about one-third the previous week's total, when compared with the weekly totals of April and May, they represent substantial buying. The advance in prime Western quotations to 5.14c. per lb., New York, has had no noticeable effect on buying activity. Sales have been well diversified as to consuming industries, and call for deliveries through the third quarter.

Lead

Sales have been holding closely to the 17,000 tons-per-week level, with all types of consumers participating in the buying. On several occasions sellers have reported that the demand was in excess of the daily intake, and this condition was undoubtedly instrumental in laying the groundwork for the price rises on Thursday and today which make the present price 4.90c. per lb., New York. The market in London has been moderately active and prices have shown little fundamental change. Prompt metal in London this morning was priced at 3.40c. per lb.

Tin

Following the lead of the London market, prices here moved upward during the past week to a high of 43.625c. per lb. for Straits metal, New York, the prevailing level today. Domestic buying has been mostly for speculative accounts, with the volume being governed by sentiment in the stock market. Fairly heavy trading all week, coupled with the presence of the buffer pool in the background, caused quotations on the London exchange to advance to new highs for the year. This morning's quotation in London on cash standards was £193 5s., and on three months' metal was £194 10s., a gain of about £8 over the price of a week ago.

Average Prices

The average prices of the major non-ferrous metals in June, as based on quotations appearing in THE IRON AGE, were as follows:

	Per lb.
Electrolytic copper, Conn. Valley	9.005c.
Lake copper, Eastern delivery	9.130c.
Straits tin, spot, New York	40.36c.
Zinc, East St. Louis	4.14c.
Zinc, New York	4.53c.
Lead, St. Louis	4.00c.
Lead, New York	4.15c.

IRON AND STEEL SCRAP

JULY 6.—Reflecting the bullish state of the stock market, scrap prices continue upward. Based largely on dealer coverage on recent orders in the face of a shortage of material, prices on steel-making grades have been advanced 50c. at Pittsburgh, Chicago and Philadelphia, bringing THE IRON AGE composite price on No. 1 steel up 50c. to \$12.58. Since June 14, the average has regained the ground lost in the interval between April 12 and June 7, when the composite hit bottom at \$11.

Buying prices in Detroit skyrocketed last week and this, with No. 1 steel up \$2.75, bundles \$2.25 higher, and low-phos plate scrap commanding \$3 more than a week ago. At Buffalo, blast furnace grades are much stronger as a result of a sale of 3000 tons to a local furnace. New York prices are carried upward by the strength of the Philadelphia market.

New York

In the face of a continued demand from mills in eastern Pennsylvania, dealers buying prices for material on cars have been advanced \$1 to \$1.50 on steel making grades. Stove plate is scarce and has shared in the general rise. Export buying prices have again advanced, and brokers are offering \$1 more than last week to cover recent European orders. Contrary to the impression given last week, at least two of the principal exporters were loading boats at that time. As a result of the upsurge in the domestic market, exporters are now paying \$10.50 and over to cover an order at \$10 for No. 1 steel, as compared with buying prices of \$8.50 to \$9.50 a month ago when the last sale to the cartel was made.

Pittsburgh

Owing to holiday shutdowns the market is less active than a week ago. However, a moderate sized tonnage of No. 1 heavy melting was purchased late last week at \$13.25. Brokers are paying \$13 and more to cover on this order, while other brokers are paying as high as \$13.50 for No. 1 for other nearby points. No. 1 heavy melting is quotable this week at \$13 to \$13.50, a rise of 50c. a ton from last week's prices.

Chicago

Sentiment, spurred on by high broker bids and the inevitable bullishness caused among scrap traders by a rising stock market, has brought about an increase of 50c. a ton in No. 1 steel and markups of 25c. to \$1 in other grades. Quoted at \$11 to \$11.50 heavy melting is said by brokers to be difficult to obtain at even the top figure. A sale at \$12 would be made, it is heard, but no mills seem interested at the moment.

Philadelphia

In a flush of bullishness, dealers with scrap accumulations continue to hold on to supplies to realize higher prices, the result being additional constriction in available scrap in this district which has already been skimmed of all distress material. Brokers again have raised offers for No. 1 and No. 2 steel delivered at practically every district mill, the resulting ruling mill quotations now being nominally in the neighborhood of \$13 to \$13.50 for No. 1 and \$11.50 to \$12 for No. 2. The Budd Co. July list of compressed bundles, about 2000 tons, has been bid in at slightly over \$12 f.o.b., and published quotations are consequently revised to conform to this test sale. The bulk of the specialties are nominally unchanged for the week, although some minor transactions have advanced stove plate, shafting and turnings 50c. to \$1. The current bullish price wave has slowed down somewhat, but underlying strength is yet as firm as it has been the past fortnight.

Cleveland

The market remains nominally strong, with dealers here holding for higher prices and those who sold a Cleveland mill still trying to cover. The price paid in the large sale at Youngstown and the resulting strength have made it impossible for any Cleveland mill to buy No. 1 steel at less than \$12 per ton right now. Meanwhile, the differential with pig iron has been narrowed drastically, since pig iron dropped \$4 per ton and scrap rose \$2 per ton. No. 1 heavy melting is quoted at \$12.50 to \$13 at Youngstown and \$11.50 to \$12 at Cleveland.

Buffalo

The feature of the market was the sale late last week of 3000 tons of mixed bongs and turnings to a blast furnace interest at a price reported to have been \$6.50 per ton. This follows a sizable transaction in the same commodity reported last week to a district consumer at a price ranging between \$6 and \$6.50 delivered. Some No. 4 blast furnace grade was included. Some activity has occurred in machine shop turnings for district consumption and sales have been reported outside the city at \$6.50. The buying policy of the largest area consumer remains the same, though transactions by other mills have strengthened the market. The principal consumer still is offering \$10.50 for No. 1 steel and \$8.50 for No. 2 steel, but is not eager to buy, inasmuch as it is reported to have about two years' supply of scrap on hand at present rate of operation.

St. Louis

It is a dealers' market in scrap iron. Although the price of pig iron has been reduced and the steel mills in the St.

Louis area are not in the mood to buy any more scrap for the present, dealers have advanced prices on some items, notably heavy melting steel. The advances are due, dealers say, to the desire of dealers to cover short orders.

Cincinnati

Interest in old materials bounded upward the past week as dealers acted to take advantage of anticipated improvement in the steel market. While the local situation has only mill bargain hunting as basis for estimating consumer interest, conditions in other areas tend to strengthen the market undertone. Dealers are bidding all types of scrap upward, with No. 1 steel in greatest demand and becoming increasingly scarce. Foundry inquiry for scrap also was active early in the week until the cut in pig iron prices.

Detroit

Long retarded in its upward movement by utter lack of activity, the Detroit scrap market prices jumped \$2 to \$3 a ton when tested last week for the first time in a month. Major increases were recorded in heavy melting steel, bundles, bushelings, sheet clips and low phos plate. Blast furnace grades showed remarkable strength in view of the inactivity and low price that have prevailed for weeks. Almost dramatic was the increase in dealers' buying prices for hydraulic compressed sheets. On Monday, a week ago, bundles would bring only \$8.75, a day later an automotive list of a few carloads brought \$9.85 and by Thursday the price had topped \$11. Sheet clippings have reached \$8, double the price paid for them a month ago. Stove plate and old No. 2 busheling have not begun to move, and pending foundry activity, cast items are holding steady. The record-breaking activity and price increases of the last week are attributable largely to the fact that production of scrap has been low. Only light tonnages were offered on the early June lists. July production again will be very light, but this month will show an upturn toward the end of the month and it is believed August scrap output should show marked improvement.

Boston

The domestic delivery market is firmer in sympathy with higher prices at Pittsburgh, and exporters intimate they might pay higher prices for heavy melting steel in large tonnages, but almost nothing is moving to Pennsylvania, and exporters say little material is coming into the market. One broker early the past week raised bids on shafting from \$13 a ton on cars to \$13.50. Today he is willing to pay \$14.10 a ton, but has not been able to buy a pound. A boat is loading 7000 tons at the army base here for overseas, presumably for Italy. Another boat is taking 4200 tons at Mystic Wharf for Japan on an old order, and will stop at Providence for 2700 tons additional. Indications are that a good proportion of the 370,000 tons of scrap recently purchased by a European country will move through this port.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$13.00 to \$13.50
Railroad hvy. mltng.	14.00 to 14.50
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails	14.50 to 15.00
Rails 3 ft. and under	15.50 to 16.00
Comp. steel	13.00 to 13.50
Hand bundled sheets	12.00 to 12.50
Hvy. steel axle turn.	11.50 to 12.00
Machine shop turn.	7.50 to 8.00
Short shov. turn.	7.50 to 8.00
Mixed bor. & turn.	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Cast iron carwheels	12.50 to 13.00
Hvy. breakable cast.	12.00 to 12.50
No. 1 cupola cast.	14.00 to 14.50
RR. knuckles & cplrs.	15.25 to 15.75
Rail coil & leaf springs	15.25 to 15.75
Rolled steel wheels	15.25 to 15.75
Low phos. billet crops	15.50 to 16.00
Low phos. punchings	14.00 to 14.50
Low phos. plate	13.00 to 14.00

PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$13.00 to \$13.50
No. 2 hvy. mltng. steel.	11.50 to 12.00
Hydraulic bund.	13.00 to 13.50
Hydraulic bund. old.	10.00 to 10.50
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	14.50 to 15.00
Hvy. breakable cast.	13.50 to 14.00
No. 1 cast	15.00 to 15.50
Stove plate (steel wks)	12.00 to 12.50
Railroad malleable	14.50 to 15.00
Machine shop turn.	7.00 to 7.50
No. 1 blast furnace	6.00
Cast borings	6.00
Heavy axle turnings	10.00 to 10.50
No. 1 low phos. hvy.	16.00 to 16.50
Couplers & knuckles	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Steel axles	20.00 to 20.50
Shafting	19.00 to 19.50
No. 1 RR. wrought	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	10.50 to 11.00
Cast borings (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:	
<i>Per Gross Ton</i>	
Hvy. mltng. steel.	\$11.00 to \$11.50
Auto. hvy. mltng. steel	
alloy free	9.50 to 10.00
No. 2 auto. steel	9.00 to 9.50
Shoveling steel	11.00 to 11.50
Hydraul. comp. sheets	9.50 to 10.00
Drop forge flashings	8.75 to 9.25
No. 1 busheling	9.50 to 10.00
No. 2 busheling	3.75 to 4.25
Rolled carwheels	14.00 to 14.50
Railroad tires, cut	14.50 to 15.00
Railroad leaf springs	14.00 to 14.50
Steel coup. & knuckles	13.00 to 13.50
Axle turnings	10.00 to 10.50
Coil springs	14.50 to 15.00
Axle turn. (elec.)	10.00 to 10.50
Low phos. punchings	13.50 to 14.00
Low phos. plates, 12 in. and under	12.50 to 13.00
Cast iron borings	4.00 to 4.50
Short shov. turn	5.50 to 6.00
Machine shop turn	4.00 to 4.50
Rerolling rails	13.75 to 14.25
Steel rails under 3 ft.	14.00 to 14.50
Steel rails under 2 ft.	14.50 to 15.00
Angle bars, steel	12.50 to 13.00
Cast iron carwheels	12.75 to 13.25
Railroad malleable	11.75 to 12.25
Agric. malleable	10.00 to 10.50
<i>Per Net Ton</i>	
Iron car axles	16.50 to 17.00
Steel car axles	15.00 to 15.50
No. 1 RR. wrought	9.00 to 9.50
No. 2 RR. wrought	9.25 to 9.75
Locomotive tires	14.25 to 14.75
Pipes and flues	7.75 to 8.25
No. 1 machinery cast	11.00 to 11.50
Clean auto. cast	9.50 to 10.00
No. 1 railroad cast	9.75 to 10.25
No. 1 agric. cast	9.50 to 10.00
Stove plate	7.5 to 8.00
Grate bars	8.00 to 8.50
Brake shoes	7.50 to 8.00

YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$12.50 to \$13.00
Hydraulic bundles	12.00 to 12.50
Machine shop turn	8.50 to 9.00

CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$11.50 to \$12.00
No. 2 hvy. mltng. steel	10.50 to 11.00
Comp. sheet steel	10.75 to 11.25
Light bund. stampings	8.00 to 8.50
Drop forge flashings	9.50 to 10.00
Machine shop turn	5.50 to 6.00
Short shov. turn	6.25 to 6.75
No. 1 busheling	10.00 to 10.50
Steel axle turnings	9.50 to 10.00
Low phos. billet and bloom crops	17.00 to 17.50
Cast iron borings	5.50 to 6.00
Mixed bor. & turn.	5.50 to 6.00
No. 2 busheling	5.50 to 6.00
No. 1 cast	13.50 to 14.00
Railroad grate bars	8.50 to 9.00
Stove plate	8.00 to 8.50
Rails under 3 ft.	16.50 to 17.00
Rails for rolling	14.00 to 15.00
Railroad malleable	13.50 to 14.00
Cast iron carwheels	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$11.00 to \$11.50
No. 2 hvy. mltng. steel	10.00 to 10.50
Scrap rails	12.50 to 13.00
New hvy. b'dled sheets	9.50 to 10.00
Old hydraul. bundles	8.00 to 8.50
Drop forge flashings	10.00 to 10.50
No. 1 busheling	10.00 to 10.50
Hvy. axle turnings	9.00 to 9.50
Machine shop turn	6.00 to 6.50
Knuckles & Couplers	14.50 to 15.00
Coll & leaf springs	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
Low phos. billet crops	15.50 to 16.00
Shov. turnings	6.50 to 7.00
Mixed bor. & turn.	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Steel car axles	14.50 to 15.00
No. 1 machinery cast	13.50 to 14.00
No. 1 cupola cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Steel rails under 3 ft.	15.50 to 16.00
Cast iron carwheels	12.50 to 13.00
Railroad malleable	12.00 to 12.50
Chemical borings	8.00 to 8.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:	
Selected hvy. melting	\$10.50 to \$11.00
No. 1 hvy. melting	11.00 to 11.50
No. 2 hvy. melting	10.25 to 10.75
No. 1 locomotive tires	11.50 to 12.00
Misc. stand. sec. rails	11.00 to 11.50
Railroad springs	12.50 to 13.00
Bundled sheets	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Cast bor. & turn.	1.50 to 2.00
Machine shop turn	1.50 to 2.00
Heavy turnings	7.00 to 7.50
Rails for rolling	13.50 to 14.00
Steel car axles	15.50 to 16.00
Iron car axles	19.50 to 20.00
No. 1 RR. wrought	7.50 to 8.00
No. 2 RR. wrought	10.00 to 10.50
Steel rails under 3 ft.	13.00 to 13.50
Steel angle bars	10.50 to 11.00
Cast iron carwheels	11.50 to 12.00
No. 1 machinery cast	11.00 to 11.50
Railroad malleable	10.00 to 10.50
No. 1 railroad cast	10.00 to 10.50
Stove plate	8.00 to 8.50
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

CINCINNATI

Dealers' buying prices per gross ton at yards:	
No. 1 hvy. mltng. steel	\$9.50 to \$10.00
No. 2 hvy. mltng. steel	8.50 to 9.00
Mixed dealers steel	8.50 to 8.75
Scrap pipe	8.50 to 7.50
Steel turnings	7.50 to 7.00
Cast borings	8.50 to 7.50
Machinery cast	15.00 to 14.00
Dealers cast	13.00 to 12.00
Stove plate	11.00 to 10.50

BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$12.00 to \$12.50
Scrap steel rails	14.00 to 14.50
Short shov. turnings	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	10.00
Rails for rolling	15.00 to 16.00
No. 1 cast	14.50 to 15.00
Tramcar wheels	14.50

DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$10.00 to \$10.50
No. 2 hvy. mltng. steel	8.50 to 9.00
Borings and turnings	5.50 to 6.00
Long turnings	6.00 to 6.50
Short shov. turnings	7.50 to 8.00
No. 1 machinery cast	11.50 to 12.00
Automotive cast	11.50 to 12.00
Hvy. breakable cast	9.00 to 9.50
Hydraul. comp. sheets	10.50 to 11.00
Stove plate	6.75 to 7.25
New factory bushel	10.00 to 10.50
Old No. 2 busheling	2.50 to 3.00
Sheet clippings	7.50 to 8.00
Flashings	8.00 to 8.50
Low phos. plate scrap	11.00 to 11.50

*\$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel	\$12.50 to \$13.00
Scrap rails	12.50 to 13.00
No. 2 steel	11.50 to 12.00
Breakable cast	8.50 to 8.75
Machine shop turn	1.70
Mixed bor. & turn.	1.50
Bun. skeleton long	4.50 to 4.70
Shafting	13.75 to 14.10
Cast bor. chemical	5.50
Per gross ton delivered consumers' yards:	
Textile cast	\$12.00 to \$12.50
No. 1 machine cast	12.00 to 12.50

PACIFIC COAST

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel	\$11.65 to \$12.15
No. 2 hvy. mltng. steel	10.65 to 11.15

CANADA

Dealers' buying prices at their yards, per gross ton:	
Toronto Montreal	
No. 1 hvy. mltng. steel	\$10.50 \$9.50
No. 2 hvy. mltng. steel	9.50 8.50
Mixed dealers steel	8.50 7.50
Scrap pipe	8.50 7.50
Steel turnings	7.50 7.00
Cast borings	8.50 7.50
Machinery cast	15.00 14.00
Dealers cast	13.00 12.00
Stove plate	11.00 10.50

EXPORT

Dealers' buying prices per gross ton:	

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PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point, Prices delivered Detroit are \$2 higher.

Per Gross Ton

Rerolling \$34.00
Forging quality 40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton

Pittsburgh, Chicago, Youngstown or Cleveland \$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Galveston (—)
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Youngstown, Cleveland, Buffalo and Birmingham 2.25c.
Detroit, delivered 2.35c.
Philadelphia 2.62c.
New York 2.66c.
On cars dock Tex. Gulf ports. 2.60c.
On cars dock Pacific ports. 2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham and Moline 2.10c.
On cars dock Tex. Gulf ports. 2.45c.
On cars dock Pacific ports. 2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Birmingham, Buffalo, Cleveland or Sparrows Pt. 2.05c.
Detroit, delivered 2.15c.
On cars dock Tex. Gulf ports. 2.40c.
On cars dock Pacific ports. 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Buffalo Sparrows Point, Cleveland, Youngstown or Birmingham 1.90c.
Detroit, delivered 2.00c.
On cars dock Tex. Gulf ports. 2.25c.
On cars dock Pacific ports. 2.35c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Base per Lb.

Pittsburgh, Buffalo, Cleveland, Chicago and Gary 2.70c.
Detroit, delivered 2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c.
Philadelphia, del'd 2.15c.
New York, del'd 2.29c.
On cars dock Tex. Gulf ports. 2.45c.
On cars dock Pacific ports. 2.70c.
Wrought iron plates, P't'g. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Tex. Gulf ports. 3.70c.
On cars dock Pacific ports. 3.95c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Buffalo, Bethlehem or Birmingham. 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Tex. Gulf ports. 2.45c.
On cars dock Pacific ports. 2.70c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Tex. Gulf ports. 2.85c.
On cars dock Pacific ports. 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton. \$42.50
Angle bars, per 100 lb. 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton \$43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes 3.15c.
Tie plates, steel 2.30c.
Tie plates, Pacific Coast ports. 2.40c.
Track bolts, to steam railroads 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Welton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

PRICES F.O.B. UNLESS OTHERWISE NOTED

Hot Rolled

Base per Lb.

Pittsburgh, Chicago, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown or Middletown 2.15c.
Detroit, delivered 2.25c.
Philadelphia, delivered 2.47c.
Granite City, delivered 2.25c.
On cars dock Pacific ports. 2.75c.
Wrought iron, Pittsburgh 4.25c.

Cold Rolled*

Pittsburgh, Chicago, Birmingham, Buffalo, Youngstown, Cleveland or Middletown 3.20c.
Detroit, delivered 3.30c.
Philadelphia, delivered 3.52c.
On cars dock Pacific ports. 3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.82c.
Granite City, delivered 3.60c.
On cars dock Pacific ports. 4.10c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.
Armature 3.55c.
Electrical 4.05c.
Special Motor 4.95c.
Special Dynamo 5.65c.
Transformer 6.15c.
Transformer Special 7.15c.
Transformer Extra Special 7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.95c.
F.o.b. cars dock Pacific ports. 4.55c.

Vitreous Enameling Stock, 20 Gage

Pittsburgh, Gary, Youngstown, Middletown, Cleveland or Detroit 3.35c.
Granite City 3.55c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

Black Plate

Pittsburgh 3.30c.
Gary 3.40c.
Granite City 3.50c.
On cars dock Pacific ports, boxed 4.175c.

Tin Plate

Base per Lb.

Standard cokes, Pittsburgh \$5.35
Standard cokes, Gary 5.45
Standard cokes, Granite City 5.55

Special Coated Manufacturing Ternes

Base per Lb.

Pittsburgh \$4.65
Gary 4.75
Granite City 4.85

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C. \$12.00
15-lb. coating I.C. 14.00
20-lb. coating I.C. 15.00
25-lb. coating I.C. 16.00
30-lb. coating I.C. 17.25
40-lb. coating I.C. 19.50

HOT ROLLED STRIP

**Prices F.o.b. Unless Otherwise Noted
(Widths up to 12 in.)**

Base per Lb.

Pittsburgh, Chicago, Cleveland, Middletown, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
Granite City 2.25c.

Cooperage Stock

Pittsburgh & Chicago 2.35c.

COLD ROLLED STRIP*

Base per Lb.

Pittsburgh, Youngstown or Cleveland 2.95c.
Chicago 3.05c.
Worcester 3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown or Cleveland 3.10c.
Worcester 3.50c.

COLD ROLLED SPRING STEEL

Pittsburgh

and
Cleveland Worcester

Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51-.75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago and Cleveland)

To Manufacturing Trade

Per Lb.

Bright wire	2.60c.
Galvanized wire	2.65c.
Spring wire	3.20c.

To the Trade

Base per Keg

Standard wire nails	\$2.45
Coated nails	2.45
Cut nails, carloads	—

Base per 100 Lb.

Annealed fence wire	\$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Barbed wire, galvanized	3.20
Twisted barbless wire	3.20
Woven wire fence, base column	67
Single loop bale ties, base col.	56

Note: Birmingham base same on above items, except spring wire.

Add \$4 a ton for Mobile, Ala.; \$5 for New Orleans; \$6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are \$1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel	Black Galv.	Wrought Iron
1 in. Black	56	36
1/2 to 5/8 in.	59	43 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.	68 1/2	60 1/2

Lap Weld

2	61	52 1/2
2 1/2 & 3 in.	64	55 1/2
3 1/2 to 6 in.	66	57 1/2
7 & 8 in.	65	55 1/2
9 & 10 in.	64 1/2	55
11 & 12 in.	63 1/2	54

Butt Weld, extra strong, plain ends

1/2 in.	54 1/2	41 1/2
1/2 to 3 in.	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.	67	60

Lap Weld, extra strong, plain ends

2	59	51 1/2
2 1/2 & 3 in.	63	55 1/2
3 1/2 to 6 1/2 in.	66 1/2	59
7 & 8 in.	65 1/2	56
9 & 10 in.	64 1/2	55
11 & 12 in.	63 1/2	54

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 3 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless	Lap
Cold Drawn	Hot Rolled	Hot Rolled
1 in. o.d. .13 B.W.G.	\$ 9.01	\$ 7.82
1 1/4 in. o.d. .13 B.W.G.	10.67	9.26
1 1/2 in. o.d. .13 B.W.G.	11.79	10.23
1 1/4 in. o.d. .13 B.W.G.	13.42	11.64
2 in. o.d. .13 B.W.G.	15.03	13.04
2 1/4 in. o.d. .13 B.W.G.	16.76	14.54
2 1/2 in. o.d. .13 B.W.G.	18.45	16.01
2 1/4 in. o.d. .12 B.W.G.	20.21	17.54
2 1/2 in. o.d. .12 B.W.G.	21.42	18.59
3 in. o.d. .12 B.W.G.	22.48	19.50
3 1/4 in. o.d. .11 B.W.G.	23.87	24.62
4 in. o.d. .10 B.W.G.	35.20	30.54
5 in. o.d. .9 B.W.G.	54.01	46.87
6 in. o.d. .7 B.W.G.	82.93	71.96

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	\$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham	43.00
Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00
Class "A" and gas pipe, \$3 extra 4-in. pipe is \$3 a ton above 6-in.	

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$42, Birmingham, and \$50 delivered Chicago and 4-in. pipe, \$45, Birmingham, and \$54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. & 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1 1/8 in. and larger	60 and 5*
Lag bolts	60 and 10
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	

1/2 in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1 1/8 in. and larger	60
Less carload lots and less than full container quantity. Less carloads lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.	

semi-finished hexagon units, U.S.S. and S.A.E.:

1/2 in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1 1/8 in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Base per 100 Lb.
(F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham)

Small Rivets

(7/16-in. and smaller)

Per Cent Off List
(F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham)

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

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Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

Milled standard set screws, case hardened, 1 in. dia. and smaller

Milled headless set screws, cut thread 1/4 in. and smaller

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller

Upset set screws, cup and oval points

Milled studs

Per Cent Off List
Milled cap screws, 1 in. dia. and smaller

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	2.45c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs \$3.65
	<i>Per Cent Off List</i>
Track bolts, all sizes per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	\$4.35
Wire, black, soft ann'l'd, base per 100 lb.	\$3.30
Wire, galv. soft, base per 100 lb.	\$3.70
Common wire nails, per keg	\$2.90
Cement coated nails, per keg	\$2.90

On plates, structural, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

*Delivered in Pittsburgh switching district.

**Prices on application.

CHICAGO Base per Lb.

Plates and structural shapes	3.55c.
Soft steel bars, rounds	3.60c.
Soft steel bars, squares and hexagons	3.75c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	3.75c.
Hot-rolled sheets	3.50c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	\$4.40
Track bolts (keg lots)	5.60
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05

Per Cent Off List

Machine bolts and carriage bolts, 1/2 in. and smaller	60
Lag screws	**55 and 5
Hot-pressed nuts, sq. and hex. tap or blank, 1/2 by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring coppers	45
Stove bolts in full packages	72 1/2
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$3.75 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c't'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies to orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.83c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. char-coal	7.50 to 8.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.

IRON AND STEEL WAREHOUSE PRICES

Cold-rolled: strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galvanized sheets (24 ga.)	4.60 to 4.85c.
Long terne sheets (24 ga.)	5.50 to 6.20c.
Armco iron, galv. (24 ga.)	6.25c.
Toncan iron, galv. (24 ga.)	6.25c.
Galvanneal (24 ga.)	6.50c.
Armco iron hot-rolled (10 ga.)	4.60c.
Toncan iron, hot-rolled (10 ga.)	4.60c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled, annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, 1/8 in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	\$3.25

Cold-finished strip	3.35c.
Galvanized sheets (No. 24)	4.63c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Per Cent Off List	
Machine and carriage bolts, small	65 and 5
Large (to and incl. 1 in. diam.)	60 and 10
1 1/4 in. and larger	60 and 5
Nuts, 100 count	
1/2 in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 5 and 5
1 1/4 in. and larger	60 and 5

* For 5000 lb. or less.

CINCINNATI

Base per Lb.

Plates	3.80c.
Structural shapes	3.83c.
Floor plates	5.58c.
Bars, rounds, flats and angles	3.85c.
Other shapes	3.85c.
RAIL steel reinforce. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.00c.
Cold-finished bars	4.30c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	4.78c.
Hot-rolled sheets (No. 10)	3.75c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$3.45
Com. wire nails, base per keg: Any quantity less than carload.	3.05
Cement c't'd nails, base 100-lb. keg	3.05
Chain, lin. per 100 lb.	7.50

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	\$23.97
4-in.	56.56
Lap-welded steel boiler tubes, 2-in.	22.80
4-in.	53.25

BUFFALO Base per Lb.

Plates	3.80c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds and hex.	4.05c.
Cold-rolled strip steel	3.57c.
Hot-rolled annealed sheets 3/16 x 14 in. to 48 in. wide incl. also all sizes No. 8 to 30 gage	3.50c.
Galv. sheet (No. 24)	4.40c.
Bands and hoops	3.60c.
Heavy hot-rolled sheets	4.00c.
Com. wire nails base per keg	\$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON Base per Lb.

Channels, angles	4.26c.
Tees and zees, under 3 in.	4.51c.
H beams and shapes	4.10c.
Plates — Sheared, tank and univ. mill, 3/4 in. thick and heavier	4.11 to 4.61c.
Floor plates, diamond pattern	5.76c.
Bar and bar shapes (mild steel)	4.26c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.46 to 5.46c.
Half rounds, half ovals, and bevels	5.51c.
Tire steel	5.51c.
Cold-rolled strip steel	3.86c.
Cold-finished rounds, squares and hexagons	4.71c.
Cold-finished flats	4.71c.
Blue annealed sheets, No. 10 ga.	4.21c.
One pass cold-rolled sheets	5.16c.
No. 24 ga.	5.16c.
Galvanized steel sheets, No. 24 ga.	5.15c.
Lead coated sheets, No. 24 ga.	6.61c.
Price delivered by truck in metropolitan Boston, subject to quantity differentials.	

DETROIT

Base per Lb.

Soft steel bars	2.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.55c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)**	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

** In Detroit only, 1500 to 3749 lb., base less 0.25c.; 3750 to 7499 lb., base less 0.40c.; 7500 lb. and over, base less 0.60c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.88c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.98c.
Soft steel bars, squares and hexagons	4.13c.
Hot-rolled strip	4.23c.
Hot-rolled annealed sheets (No. 24)	4.73c.
Galvanized sheets (No. 24)	5.38c.
Cold-finished steel bars	4.43c.
Structural rivets (keg lots)	5.18c.
Boiler rivets, cone head (keg lots)	5.28c.
Track spikes (keg lots)	4.63c.
Track bolts (keg lots)	5.83c.
Black annealed wire (No. 6 to No. 9 incl.)	3.85c.
Com. wire nails and cement coated nails 100 to 4999 lb.	3.30c.

Per Cent Off List

Machine bolts and carriage bolts, 1/2x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60-5
1 1/2 in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over	
1/2 in. and smaller	62 1/2
9/16 to 1 in.	60
1 1/2 in. and over	50-10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	\$3.85 base
Structural shapes and plates	3.75 "
Hot rolled sheets No. 10 ga.	3.80 "
Hot rolled sheets No. 24 ga.	4.40 " 3500 lb. and over
Galvanized sheets No. 24 ga.	5.05 " 3500 lb. or more
Strip	4.05 "
Reinforcing bars	3.85 "
Floor plates	5.96 "
Cold finished bars	4.91 "
Machine and carriage bolts	50 & 10 off list
Rivets (structural)	\$4.60 base
On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.	

BALTIMORE

Base per Lb.

Mild steel bars and small shapes	3.80c.
Structural shapes	3.65c.
Reinforcing bars, 5 to 15 tons	On Application
Plates	3.65c.
Hot-rolled sheets	3.70c.
Bands	3.95c.
Hoops	4.35c.
Special threading steel	3.95c.
Checkered floor plates 1/4 in. and heavier	5.00c.
Galvanized sheets, No. 24, 100 bds. or more	4.30c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	4.25c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 1999 lb. All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

Quantity differentials on the basis of combined weight of hot rolled products ordered in one day: Under 100 lb., add \$1; 100 to 399 lb., add .50c.; 400 to 1999 lb., base; 2000 to 9999 lb., deduct 20c.; 10,000 to 39,999 lb., deduct 30c.; 40,000 lb. and over, deduct 40c.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.90c.
Iron bars	3.90c.
Reinforcing bars	3.70c.
Structural shapes	3.85c.
Plates	3.85c.
Hot-rolled sheets No. 10	3.80c.
Hot-rolled annealed sheets	3.80c.
Galvanized sheets No. 24	4.40c.
Steel bands	4.05c.
Cold-finished bars	4.70c.

* Plus mill item extra.

MEMPHIS

Base per Lb.

Mild steel bars	4.01c.
Shapes, bar size	4.01c.
Iron bars	4.01c.
Structural shapes	3.96c.
Plates	3.96c.
Hot-rolled sheets	3.91c.
Galvanized sheets, No. 24	5.26c.
Steel bands	4.16c.
Cold-drawn rounds	4.61c.
Cold-drawn flats, squares, hexagons	6.61c.
Structural rivets	5.25c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	\$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.95c.	4.30c.	4.25c.
Shapes, standard	3.95c.	4.30c.	4.25c.
Soft steel bars	4.05c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.675c.	2.975c.	2.975c.
Hot-rolled annealed sheets (No. 24)	(—)	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.10c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.25c.	5.05c.	—
Galv. sheets (No. 22 and heavier)	5.50c.	5.05c.	—
Cold-finished steel	6.55c.	6.85c.	7.10c.
Rounds	7.80c.	8.10c.	7.10c.
Squares and hexagons	8.30c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.20	\$3.05	\$3.40
All items subject to differentials for quantity.			

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$47.50
Chicago District	56.05
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$21.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	23.50
Delivered Newark or Jersey City	22.53
Delivered Philadelphia	21.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago and Youngstown*	20.00
F.o.b. Buffalo	20.00
Delivered Cincinnati	20.16
F.o.b. Duluth	20.50
F.o.b. Provo, Utah	22.00
Delivered, San Francisco, Los Angeles or Seattle	26.95
F.o.b. Birmingham*	16.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$21.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	19.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago and Youngstown*	19.50
Delivered Canton, Ohio	20.89
Delivered Mansfield, Ohio	21.44
F.o.b. Birmingham	15.00

Bessemer

F.o.b. Buffalo	\$21.00
F.o.b. Everett, Mass.	22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
Erie, Pa., and Duluth	21.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown*	20.50
F.o.b. Birmingham	21.00
Delivered Cincinnati	21.11
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.

Gray Forge

Valley or Pittsburgh furnace \$19.50

Charcoal

Lake Superior furnace \$25.00
Delivered Chicago 28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sll. 2.25 to 2.75	\$26.50
No. 2 fdy., sll. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sll. 2.25 to 2.75	\$27.50
No. 2 fdy., sll. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans. *Per Gross Ton*
Domestic, 80% (carload) \$92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic 19 to 21% \$28.00
Domestic, 26 to 28% 33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk) \$69.50*
50% (ton lots in 50 gal. bbl.) 80.50*
75% (carload lots, bulk) 126.00*
75% (ton lots in 50 gal. bbl.) 139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio Per Gross Ton

10.00 to 10.50% \$28.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional. Phosphorus 0.75% or over, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50 \$23.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon 10.50c.*
2% carbon 16.50c.*
1% carbon 17.50c.*
0.10% carbon 19.50c.*
0.06% carbon 20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon \$92.75
2.50% carbon 97.75
2% carbon 102.75
1% carbon 112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally \$2.00

Ferrotungsten, lots of 500 lbs. nominally 2.05

Ferrotungsten, smaller lots, nominally 2.10

Ferrovanadium, contract, per lb. contained V, delivered \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots \$2.25†

Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton \$142.50

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton \$157.50

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton \$58.50

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (St. Louis), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville \$75.00

Ferromolybdenum, per lb. Mo. f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo. f.o.b. furnace 80c.

ORES

Lake Superior Ores

Delivered Lower Lake Ports Per Gross Ton

Old range, Bessemer, 51.50% \$5.25
Old range, non-Bessemer, 51.50% 5.10
Mesabi, Bessemer, 51.50% 5.10
Mesabi, non-Bessemer, 51.50% 4.95
High phosphorus, 51.50% 4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal 17.00c.
Iron, low phos., Swedish, average, 68 1/2% iron. Nominally 17 to 18c.
Iron, basic or foundry, Swedish, aver. 65% iron. Nominally 15c.
Iron, basic or foundry, Russian, aver. 65% iron. Nominally
Man., Caucasian, washed 52% 40c.
Man., African, Indian 44-48% 35c.
Man., African, Indian, 49-51% Nominally 38c.
Man., Brazilian, 46 to 48% Nominally 38c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered \$20.50
Tungsten, domestic, scheelite delivered \$20.00 to 21.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:
ton: South African (low grade) 15.00
Rhodesian, 45% 21.00
Rhodesian, 48% 24.50
Turkish, 48-49% 24.00 to 25.00
Turkish, 45-46% 22.50 to 23.00
Turkish, 44% 18.00 to 18.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:
50% 24.50 to 25.50
48-49% 24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail \$18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines \$18.00 to 19.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid 24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines 31.50

FUEL OIL

Per Gal.

No. 2 or diesel, f.o.b. Bayonne 4.00c.
No. 6, f.o.b. Bayonne 2.26c.
Del'd Chicago, No. 5 Bur. Stds. 3.25c.
Del'd Chicago, No. 6 Bur. Stds. 2.75c.
Del'd Cleve'd, No. 3 distillate 5.00c.
Del'd Cleve'd, No. 4 industrial 5.25c.
Del'd Cleve'd, No. 5 industrial 3.25c.
Del'd Cleve'd, No. 6 industrial 3.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connells-ville, Prompt \$3.75
Foundry, f.o.b. Connells-ville, Prompt \$4.75 to 5.50
Foundry, by-product, Chicago ovens 10.25
Foundry, by-product, del'd New England 12.50
Foundry, by-product, del'd Newark or Jersey City 10.88 to 11.40
Foundry, by-product, Philadelphia 10.95
Foundry, by-product, delivered Cleveland 11.05
Foundry, by-product, delivered Cincinnati 9.75
Foundry, Birmingham 7.50
Foundry, by-product, del'd St. Louis industrial district 11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports 14.75

Deep Drawing and Pressing Problems

(CONTINUED FROM PAGE 53)

a rimming steel ingot, and therefore of the sheet rolled from it, is a central core in which is segregated most of the impurities, and incidentally most of the carbon, bounded by surface layers of relatively pure iron. If the core is unusually high in carbon and impurities, it will possess a ductility which is much less than that of the surface layers, because of a smaller crystal size and the hardening effect of the dissolved impurities and the precipitated carbide.

Well defined layers containing a high proportion of phosphorus, seen under the microscope as continuous white lines, are another common cause of reduced ductility in commercial sheet. This defect, if pronounced, can seriously reduce the ductility of an otherwise satisfactory sheet. It is usually considered unreasonable for the user to reject sheet solely on account of pronounced phosphorous segregation, yet he often finds that the severity of this one defect may determine the success or failure of sheets in severe pressing operations.

The crystal structure of a good proportion of steel sheets tends, at least by comparison with that of brass, to be reasonably satisfactory as regards both the mean size of the crystals and also the regularity of size, that is, the maximum and minimum sizes which co-exist. Although the crystal structure of annealed sheets, if not as regular as that of normalized sheets, still tends in these days to be reasonably good, occasional serious lapses from grace are not unknown due to critical-strain crystal growth.

Directional properties in steel sheets vary rather widely in severity. When pronounced, directionality can constitute a serious defect. It should be borne in mind that, in steel, directional effects attributable solely to crystal structure are supplemented by others attributable to elongated planes of segregated chemical constituents and non-metallic inclusions. Marked directional properties may cause sheets to fail in two ways; that is, there may be a reduction of ductility in a certain direction to a value so much below normal that fracture will occur at 90 deg. to this direction under normal conditions of pressing or drawing. If insufficiently pronounced to cause actual failure, a reduction in ductility in certain definite directions may still produce what are known as "ears" in a pressed or drawn article. The formation of ears in a pressed, as



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distinct from a drawn article, may cause trouble in an exactly similar way and, as the metal is more free to flow according to its natural inclinations, the general flow in the whole article will be influenced and may cause local thinning and even failure.

Surface defects sometimes cause trouble. The majority of these defects can be placed in one or two categories: Blemishes attributable to the presence of sub-surface discontinuities, which may be due either to ordinarily non-metallic inclusions or voids or else to special defects attributable to mold defects, splashing, or such causes. It must be borne in mind that the whole surface of steel ingots are not machined, as brass ingots often are, to remove surface blemishes, and local trimming with pneumatic gouging chisels removes only the larger, visible surface defects. When the sheet is stretched, these defects may open up or appear as blisters or localized rumpling of the surface. Blemishes are attributed to rolled-in mill scale which has been dissolved during pickling. The residual cavities may be hardly noticeable in cold rolled sheets, but, when the sheet is stretched, the cavities open up into blemishes which, although of small size, spoil the surface for many purposes.

Problems arising from irregular thickness can at times be serious, particularly in large sheets as used for automobile body parts. If the thickness of a blank is not uniform, the metal may flow in an undesired manner, because all the area of the pressure plate cannot exert its normal restrictive action. Alternatively, the thicker zones of the sheet may be gripped by the pressure plate so tightly that the metal cannot flow, and therefore breaks.

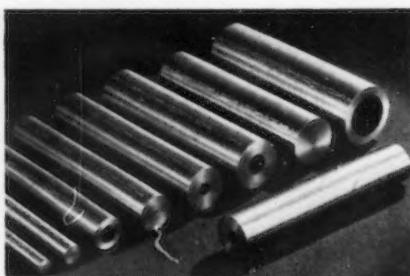
Age hardening, an effect which occurs in a large proportion of deep-drawing and pressing operations on quality steel sheets, causes the physical properties of cold rolled sheets, or shapes drawn from annealed sheets, to change with time, as shown on Fig. 7. From the viewpoint of the user, age hardening is a defect because, if a long delay occurs between successive operations, the steel may lose so much of its ductility that the next, and normally safe operation, results in failure. It is unsafe to use hardness tests as a quantitative indication of loss of ductility due to this cause, as the decrease in ductility which may result from standing after cold working is often much greater than the increase in indentation hardness suggests.

A last defect to be mentioned arises from the natural tendency of soft, low carbon steel to develop what are known in industry as "stretcher strain markings" when stretched to an elongation of not more than 4 per cent. Stretcher strain markings can be avoided, or at least minimized, by using sheet which has been given a very light cold pass, often termed "temper rolling" after the final annealing operation. The practical effect of this very light cold rolling is to change the shape of the stress-strain curve from that probably associated with mild steel, in other words it removes the curious kink in the curve which gives the effect known as the yield point. Unfortunately, even very light cold rolling lowers the ductility of sheets, and the difficult art of temper rolling lies in giving sheets just that degree of cold rolling which will obliterate the yield point elongation as

nearly as possible, yet will not reduce the ductility enough to make the sheet break during any given pressing operation. It is important to bear in mind that if temper rolled sheets are allowed to stand for long periods, the curve given by it reverts gradually back. Temper rolled sheets should therefore be pressed as soon as possible after the final rolling treatment. In America it is claimed that what is called "non-ageing" steel, which is immune from both stretcher strain markings and age hardening, is now available commercially. This steel contains both aluminum and titanium and is given a special annealing treatment in which the temperature, time of soaking and the cooling rate are closely controlled. It is understood that this type of steel has been produced only on a laboratory scale in Great Britain, but its industrial advent will be very welcome.

Bunting to Sell New Type of Bronze Bar

THE Bunting Brass & Bronze Co., Toledo, has developed and is now selling a new line of cored and solid bronze bars known as "Bunting precision bronze bars." This material was developed to provide an alloy that would have ample strength to resist heavy loads and perform satisfactorily



THE new Bunting bronze bars are machined with extreme accuracy to assure concentricity and a minimum of consumer waste.

under many and different adverse operating conditions and at the same time embody what is said to be exceptional anti-frictional qualities, giving long life and a minimum amount of wear.

The new bars, in addition to a machined outside diameter and 13-in. lengths, are still further improved by having the cored sizes machined in the bore to the same accurate dimensions as have been common to the O.D., which thus results in a degree of con-

centricity not possible in rough bars. Enough stock is left on the O.D. and I.D. to finish a bearing from the bar to the size stamped on the bar by taking off only a 1/64-in. cut. By supplying these bars in the completely finished state, valuable savings are effected by the user in reduced machining time and minimum waste of metal. The 13-in. length has proved most suitable for obtaining the greatest number of pieces without excessive waste. Over 240 sizes of these fully machined cored and solid bronze bars are now carried in stock.

New Type Metal Fastener

A NEW type metal fastener, which has a serrated split stud which locks within an internally serrated sleeve, has been developed recently by Hopkan Rivet Co., Inc., Pittsburgh. The new product, operating on a rivet principle, has been designed for applications where lack of space or fragile materials are involved or where the conventional rivet application is impractical. Two halves of the stud spring together at the slot when the stud is forced into a sleeve under pressure. The serrations of both the stud and the sleeve lock into each other and under normal conditions, cannot be disengaged.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... Orders are slow and inquiries erratic in most districts, but sentiment is a little better . . . Cut in steel and pig prices not expected to affect machine tool prices.

Domestic Lathe Demand Higher at Cincinnati

CINCINNATI—The local machinery market ruled spotty the past week. While total orders were a trifle less than in the preceding week, there was a slight shift in type ordered. Lathes were more active than other tools and were above the level of the previous week. An encouraging feature was the fact that domestic demand predominated. On the other hand, millers and grinders were less active than during the preceding period, although multiple unit orders were reported. Manufacturers, however, indicated that foreign business in these types was greater than domestic.

Orders Slow, Inquiries Erratic in Cleveland

CLEVELAND—The optimism and signs of improvement evident in the latter part of June are slow in becoming translated into orders. While several local purchases are nearing the contract stage, new inquiries continue erratic. Automotive buying of any consequence is still well in the future. Press manufacturers cannot see any hope for much business from the Detroit manufacturers until late August or September. As far as the local scene is concerned, vacation shutdowns will be widespread in July. The recent downward plunge of steel prices may not have any immediate effect upon machine tool or press prices.

June Poorest Month Thus Far In Metropolitan Area

NEW YORK—Most sellers in the local area admitted that June made the poorest showing in terms of bookings for any month in 1938 thus far. Except for an occasional machine from one on the Eastern arsenals, orders were almost completely absent, particularly in the last week or two. Sentiment has improved somewhat, however, although much of the newly developed optimism is linked up with the bullish activity in Wall Street. Some report a better volume of inquiries on the part of general industry, but feel it will be another month before this reawakened interest is translated into buying. The same is true of the Navy yards and the arsenals, whose new fiscal year began on July 1. Informal lists have been issued by the Brooklyn Navy Yard, but it will probably be several weeks before formal tenders are asked for on the equipment desired. Watervliet Arsenal has a list of about 15 miscellaneous tools on which quotations are being taken subject to the new appropriations

going through. Several of the other arsenals are planning the usual summer vacation shutdowns for three weeks in the near future.

Detroit Tool and Die Shops Gain in Activity

DETROIT—Despite improvement in sentiment, machine tool activity continued at an uncertain level, although activity in the tool and die shops has shown gains recently. In this regard, die and fixture work shows the greatest activity, while the demand for perishable tools is negligible.

Steel Price Cut Not To Affect Machine Prices

CHICAGO—The prospect of a decrease in machine tool prices is not considered imminent, notwithstanding recent reductions in steel quotations. Doubt is expressed by some as to whether such action would result in additional business, while others point to the foreign orders, with which some plants will be occupied

until September, as an argument against a decrease. Exceptionally few orders are being received in this area, one seller reporting last month's bookings as only 5 per cent of normal. Small tool demand is holding at 30 to 40 per cent of last year's figures.

TRADE NOTES.

Ferry Cap & Set Screw Co., 2151 Scranton Road, Cleveland, is now marketing its full finished hexagon head cap screws under the name "Shinyheads." The product is manufactured with American standard dimensions and tolerance. Heads are completely machined top and bottom with top of head chamfered and bearing surface washer faced. The point is completely machine turned; flat and chamfered.

F. J. Stokes Machine Co., Philadelphia, has been appointed sole sales agent for plastic molding presses manufactured by the Standard Machinery Co., of Mystic, Conn.

Dura-Products Mfg. Co., Canton, Ohio, has taken over sales and distribution nationally of all Vitralux automotive and bicycle glass reflector products, including truck reflectors, truck and bus indicators, and passenger car and bicycle glass reflectors.

National Steel Corp., Pittsburgh, on June 15, declared a dividend of 25c. a share on capital stock, payable June 30 to stockholders of record of June 25.

Hill Clutch Machine & Foundry Co., formerly located at 44 Main Street, Orange, N. J., has reestablished its New York address at 90 West Street. The office will continue to operate as the Eastern branch for power transmission and agitator sales, and Arthur L. Whiteside will be in charge as eastern representative for the company.



RALPH E. ROWLEY, recently retired chief civil engineer of the Carnegie-Illinois Steel Corp.'s Gary works, was honored recently by former associates in the steel industry. Shown above are Paule O. Menke, general manager, Shenango Furnace Co.,

Sharpsville, Pa.; J. D. Jones, chief engineer, Youngstown Sheet & Tube Co.; A. S. Gasche, general superintendent, Evanston plant, Youngstown Sheet & Tube Co.; Mr. Rowley, and C. A. Thayer, chief engineer of Republic Steel Corp.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

General Electric Co., Schenectady, N. Y., through its subsidiary, General Electric Realty Corp., same address, has asked bids on general contract for new factory branch, storage and distributing, and service building at Minneapolis, consisting of two-story and basement unit, with one-story structure adjoining. Cost close to \$300,000 with equipment. Larson & McLaren, Foshay Tower Building, Minneapolis, are architects. Minneapolis offices of company are in National Soo Line Building; E. M. Pinkerton is local manager.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 12 for six electric arc welding sets (Schedule 3837) for Brooklyn and Charlestown, Mass., Navy yards; until July 15 for 72 steel valves (Schedule 3881) for Brooklyn yard.

Department of Sanitation, City of New York, 125 Worth Street, plans new incinerator plant at West Ninth and Tenth Streets, Brooklyn, and one-story motor truck service, repair and garage building, capacity 120 cars at one time, on adjoining site. Cost \$2,000,000 with equipment; fund of \$1,900,000 has been secured through Federal aid, remainder to be furnished by city. Another fund of \$1,550,000 has been arranged, partially through same agency, for construction of 42 steel scows to replace old wooden scows now in service.

Kroder Reubel Co., Inc., 108 Meeker Avenue, Brooklyn, manufacturer of metal fixtures, hardware specialties, etc., has filed plans for new three-story plant, 50 x 100 ft., at 77-81 Herbert Street. Cost over \$75,000 with equipment. M. Allen Schlendorf, 356 Fulton Street, is architect.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until July 11 for one heavy-duty engine lathe (Circular 121); until July 25 for alloy steel forgings (Circular 122).

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for air compressors (Schedule 8823) for New York, Charlestown, Mass., and Mare Island Navy yards. Plans will be drawn soon for extensions and improvements in shipbuilding ways at New York yard, including equipment, cost about \$600,000; also for extensions in turret assembly facilities and equipment, cost \$250,000; and extensions and improvements in outside electrical distributing system, cost \$35,000. Appropriations have been authorized.

Department of Hospitals, City of New York, 125 Worth Street, plans new one and two-story automobile service, repair and garage building on Welfare Island, with machine and maintenance shops. Cost \$158,000 with equipment; financing has been arranged through Federal loan and grant. Department has filed plans for new two-story baking plant, 79 x 166 ft., at same place, to cost \$235,650 with traveling ovens, conveyors and other equipment. LeRoy P. Ward, 509 Madison Avenue, is architect.

P. Ballantine & Sons, 57 Freeman Street, Newark, N. J., brewers, have let general contract to Damon G. Douglas, 605 Broad Street, for three-story and basement mechanical-bottling plant, 60 x 110 ft., and improvements in present bottling division. Cost close to \$100,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until July 12 for seamless copper tubing (Circular 1118), 23,500 lin. ft. of extra flexible steel cable, $\frac{1}{8}$ -in. dia., and 11,000 lin. ft. of steel wire cable (Circular 1117), one staking machine (Circular 1125); until July 13, parts for stoker (Circular 1123); until July 18, one set of inspection gages for point detonating fuse (Circular 1085); until July 20,

four sets of inspection gages (Circular 1089).

Scott Paper Co., Chester, Pa., manufacturer of tissue stocks, plans expansion and improvements, including new paper-making machine, finishing and auxiliary mechanical equipment. Cost over \$300,000.

Bureau of Yards and Docks, Navy Department, Washington, will prepare plans soon for one-story turret shop unit at Philadelphia Navy Yard, cost about \$1,000,000 with equipment; also for one-story addition to structural assembly shop, cost about \$560,000 with equipment. Appropriations have been authorized.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until July 13 for gages, flush pin, plain plug, profile and other types (Circulars 1231 and 1228); until July 25, 10 to 40 transmission systems (Circular 1232); until Aug. 3, one or two finish end trim case machines, caliber 0.50 (Circular 1202), one vertical, second-draw case press, caliber 0.30; one vertical, first-draw duplex case press, caliber 0.30; one to three vertical third-draw case presses, caliber 0.30; three to seven vertical fourth-draw case presses, caliber 0.30 (Circular 1201).

◀ NEW ENGLAND ▶

Bureau of Yards and Docks, Navy Department, Washington, will prepare plans soon for following expansion and improvements at Boston Navy Yard: One-story addition to pipe shop, cost \$150,000 with equipment; extensions and improvements in power plant, cost \$110,000 with equipment; extensions and improvements in electrical circuits in shops, cost \$75,000; improvements in piping systems, cost \$20,000, and one-story steel storage and distributing building, cost \$80,000 with equipment. Appropriations have been authorized.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until July 20 for one gas-fired, oven-type furnace (Circular 293), one chamber honing machine (Circular 301); until July 22, four universal milling attachments for hand millers (Circular 308); until July 25 for gages, including plug, thread ring, adjustable snap, flush pin, profile, alignment, etc. (Circular 294).

Johnson Steel & Wire Co., 53 Wiser Avenue, Worcester, Mass., has let general contract to Ivar Peterson, 106 Forest Street, for one-story shop addition, 40 x 50 ft.

◀ WASHINGTON DIST. ▶

General Purchasing Officer, Panama Canal, Washington, asks bids until July 11 for machinist's vises, machine bits, screw clamps, adjustable pipe wrenches, reamers, auger bits, roller thrust bearings, knife switches, 72 steel cylinders and other equipment (Schedule 3365).

Bureau of Yards and Docks, Navy Department, Washington, has secured appropriation of \$1,750,000 for extensions and improvements in structures on Pier No. 5, Norfolk, Va., Navy Yard, including extension in crane structure over building ways and new cranes, cost \$525,000; building ways, \$40,000; extensions and improvements in power plant, including equipment, \$85,000, and additions and improvements in overhaul shops at naval air station, cost \$550,000 with equipment.

Calvert Distilling Co., Relay, Md., has let general contract to Hays & Nicoulin, 939 Franklin Street, Louisville, for five-story addition for storage and distributing division. Cost close to \$90,000 with equipment.

Board of Education, Norfolk, Va., plans

addition to Woodrow Wilson High School, for manual training shops. Cost about \$100,000. Financing is being arranged through Federal aid. Harry A. Hunt, superintendent of schools, is in charge.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 12 for six electric hoists, brakes and spare parts; four motors and brakes for bow and stern tilting and after capstan, with spare parts; two motors and brakes for anchor windlass, bow capstan and bow plane rigging and spare parts; two motors and brakes for hydraulic steering gear and spare parts, and two motors for hydraulic power plant and spare parts (Schedule 3833) for Portsmouth Navy Yard; until July 15, one universal, semi-automatic thread miller (Schedule 3889) for Alexandria yard; one light-duty engine lathe (Schedule 3891), one engine lathe, all motor driven (Schedule 3890), for Norfolk yard; 25 afterbody overhauling stands, assembled; 25 two-wheel trucks, assembled (Schedule 3867) for Newport, R. I., Naval Air Station; one motor-driven miller (Schedule 3859) for Boston yard.

◀ BUFFALO DISTRICT ▶

Rochester Gas & Electric Co., 89 East Avenue, Rochester, N. Y., plans extensions and improvements in steam-electric power plant. Cost over \$100,000 with equipment.

Niagara Macaroni Mfg. Co., 260 Court Street, Buffalo, has purchased main section of former plant of Wire Wheel Corp., 1700 Elmwood Avenue, and will remodel for new plant and remove to new location in about a month, increasing capacity. Cost over \$50,000 with equipment.

Taggart Corp., Carthage, N. Y., manufacturer of kraft and other paper stocks, has let general contract to H. K. Ferguson Co., Cleveland, for one-story addition, 100 x 120 ft., for storage and distribution. Cost over \$60,000 with equipment. Main offices are at 230 Park Avenue, New York.

◀ SOUTH ATLANTIC ▶

State Rural Electrification Authority of South Carolina, 1202 Main Street, Columbia, S. C., asks bids until July 18 for electrification system in Clarendon, Colleton, Newberry, Dillon, Darlington, Florence and neighboring counties, about 255 miles, with service facilities. U. X. Cullum is engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 15 for eight 36-in. gate valves, motor-operated, without bypass (Schedule 3865) for Charleston, S. C., Navy Yard.

Department of Public Service, Miami, Fla. C. S. Nichols, director, plans hangars, shops and other buildings and facilities at Miami International Airport. Cost about \$1,250,000 with equipment, of which \$400,000 will be secured through Federal aid.

◀ MICHIGAN DISTRICT ▶

Kozy Koach Co., Kalamazoo, Mich., manufacturer of motor trailers and parts, has acquired plant and business of Silver Dome, Inc., 50 Endicott Street, Detroit, manufacturer of similar equipment, and will operate in future as a division of organization. Purchasing company has leased former plant of Voigtmann Metal Window Corp., Kalamazoo, and will remove Detroit works to that location, where production will be increased.

Detroit Edison Co., Detroit, is arranging for a note issue of \$15,000,000, part of proceeds to be used for expansion and improvements in power plants and system.

Ford Motor Co., Dearborn, Mich., has work under way on remodeling main foundry at River Rouge plant, to include installation of considerable new equipment. Cost close to \$500,000.

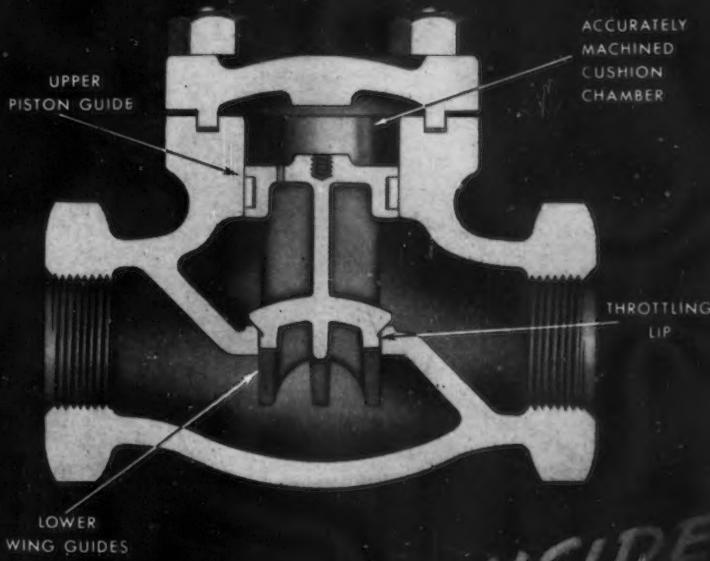
Guthrie Mfg. Co., Cadillac, Mich., recently organized by Howard and Curtis Guthrie, Cadillac, to manufacture acetylene gas gen-

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erators, has leased local building for plant, to include departments for parts production and assembling.

◀ SOUTH CENTRAL ▶

Tennessee Valley Authority. Knoxville, Tenn., plans new phosphate plant near Franklin, Tenn., comprising several units with electric-operated machinery. Work is scheduled to begin soon. Cost close to \$500,000 with equipment.

State Department of Welfare. Welfare Building, Frankfort, Ky., Frederick A. Wallis, commissioner, has asked bids on general contract for two-story industrial building and power house at new State prison at LaGrange, Ky. Cost about \$67,000, exclusive of equipment. Associated Architects and Engineers of Kentucky, Washington Building, Louisville, are architects and engineers. Ralph C. Wyatt is engineer for department.

Shelby Special Consolidated School District. Shelby, Miss., plans one-story vocational school, 35 x 73 ft. Financing will be arranged with Federal aid. N. W. Overstreet and A. H. Town, Standard Life Building, Jackson, Miss., are architects.

Ashland Oil & Refining Co. Ashland, Ky., will place additional orders soon for equipment for main oil refinery at Leach Station, near Catlettsburg, Ky., where expansion and improvements have begun. Purchases for distillation machinery and other equipment will total close to \$200,000. Entire project will cost about \$500,000.

◀ WESTERN PA. DIST. ▶

Pittsburgh & Lake Erie Railroad. P. & L. E. Terminal Building, Pittsburgh, J. H. James, purchasing agent, asks bids until July 12 for brake shoes and chilled iron car wheels (Contract No. 2-1938).

Homer Laughlin China Co. Newell, W. Va., plans extensions and improvements in power house, including three new boiler units and auxiliary equipment, automatic stokers, coal and ash-handling equipment, pumping machinery, etc. Cost over \$80,000.

◀ SOUTHWEST ▶

Royal Crown Bottlers, Inc. Kansas City, Mo., recently organized, care of E. M. Dodd, president, United States Cold Storage Co., 500 East Third Street, has leased one-story building, 150 x 150 ft., on Locust Street for mechanical-bottling, storage and distributing plant. Cost over \$150,000, of which about \$100,000 will be expended for equipment.

City Council. Winfield, Kan., plans extensions and improvements in municipal electric power plant, including additional equipment. Cost about \$175,000. Financing is being arranged through Federal aid. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Board of Education. 911 Locust Street, St. Louis, George W. Sanger, commissioner of school buildings, plans new multi-story technical high school to cost over \$450,000 with equipment; also a new multi-story technical and vocational school for negroes, to cost close to like amount. Special election is being arranged for Aug. 2 to approve bond issue of \$4,400,000 for these and other school buildings, of which part will be financed through Federal grant and loan. William B. Ittner, Inc., address noted, is architect for board.

Common Council. Wellington, Kan., plans extensions and improvements in municipal power plant, including two new boiler units and auxiliary equipment; also expansion in waterworks plant. Cost about \$200,000. Financing is being arranged through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Rio Grande Valley Citrus Exchange. Edinburg, Tex., D. C. Abney, president, plans one-story plant for production of fertilizer, using citrus fruit waste. A dehydrating plant will

be installed. Cost close to \$75,000 with equipment.

Commanding Officer, Ordnance Department. San Antonio Arsenal, San Antonio, Tex., asks bids until July 21 for bench grinder, rivets, taper pins, files, pliers and other equipment (Circular 34).

City Council. Houston, Tex., plans new municipal incinerator plant on 300-acre tract near Holmes Road. Cost about \$225,000 with furnace units, conveyors, loaders and other mechanical equipment. Financing will be arranged through Federal aid.

Chicago Molded Products Corp. 2145 West Walnut Street, Chicago, manufacturer of plastic products, has let general contract to Enjay Construction Co., 160 North LaSalle Street, for new one-story plant, 200 x 300 ft. on Kolmar Avenue. Cost close to \$225,000 with equipment.

Central Illinois Light Co. Peoria, Ill., has purchased properties of Suburban Electric Utilities Co., and its subsidiary, Suburban Electric Corp., operating at Dunlap, Ill., and vicinity, and will make extensions in lines and operating facilities. Cost about \$200,000.

◀ OHIO AND INDIANA ▶

Procter & Gamble Co. Gwynne Building, Cincinnati, soaps, washing powders, etc., has asked bids on general contract for two-story and basement addition to plant in Ivorydale district, 72 x 182 ft. Cost over \$75,000 with equipment.

Industrial Rayon Corp. West Ninety-eighth Street and Walford Avenue, Cleveland, is arranging new bond issue of \$7,500,000, part of proceeds to be used for new mill at Painesville, Ohio, now in course of erection, including power house, machine shop, pumping plant and other structures to represent a total investment of \$11,500,000.

Board of Education. Steubenville, Ohio, plans installation of manual training department in new multi-story high school. Cost about \$700,000. A special election is being arranged in August to vote bonds and other financing will be carried out through Federal aid. Fred Clarke, National Exchange Building, is architect.

Waste Collection Department. City Hall, Cincinnati, plans extensions in municipal incinerator plants on Dunbar Road and Crookshank Road, including additional furnaces, loaders and other mechanical equipment to double present capacities. Cost about \$150,000 with equipment, each plant. Financing is being arranged through Federal aid. Carlton, Frankenberger & Batson, 4122 Davis Lane, are architects; Fosdick & Hilmer, Union Trust Building, are consulting engineers.

Director, Municipal Airport. High School Road, Indianapolis, plans new hangar and mechanical shop at local airport. Cost close to \$100,000 with equipment. Financing is being arranged in part through Federal aid. M. G. Johnson is assistant city engineer in charge. Benjamin Bacon, 605 White River Parkway, South Drive, is architect.

◀ MIDDLE WEST ▶

Pullman-Standard Car Mfg. Co. 79 East Adams Street, Chicago, plans one-story addition to plant at Michigan City, Ind., for production of car wheels. Cost over \$400,000 with equipment.

United Electric Coal Co. 307 North Michigan Avenue, Chicago, has approved plans for new dock on Illinois River for loading coal barges, work to proceed at once. Cost over \$225,000 with conveying, elevating, loading and other mechanical-handling equipment.

Central Nebraska Power and Irrigation District. Third and St. Joseph Streets, Hastings, Neb., George E. Johnson, chief engineer and general manager, asks bids until July 20 for one 25,000-hp. vertical shaft Francis-type hydraulic turbine, with governor and auxiliary equipment, for Johnson No. 2 hydroelectric generating station. (Bids recently asked for this unit were rejected.)

Brown & Bigelow Co. University Avenue, Minneapolis, Minn., art printer, has asked bids on general contract for one-story mechanical shop, including service and garage unit for company cars. Cost about \$50,000 with equipment. Toltz, King & Day, Inc., Pioneer Building, is architect.

Board of Education. Burlington, Iowa, has let general contract to Hufford Construction Co., Mutual Building, Kansas City, Mo., for two-story and basement industrial and shop building. Cost about \$45,000 exclusive of equipment. Holabird & Root, 333 North Michigan Avenue, Chicago, are architects.

◀ PACIFIC COAST ▶

Union High School District. San Juan Capistrano, Cal., plans one-story addition to local high school group, for a vocational shop. Cost about \$118,000 with tools and equipment. Financing is being arranged through bond issue and Federal aid. T. C. Kistner, Architects' Building, Los Angeles, is architect.

Bureau of Supplies and Accounts. Navy Department, Washington, asks bids until July 12 for one motor-driven turret punch (Schedule 3804) for San Diego Naval Air Station; until July 19, one 150-hp. diesel-type marine engine and spare parts (Schedule 3860) for Puget Sound yard; until July 22, seamless steel tubing (Schedule 3885) for Puget Sound and Eastern yards; five steel safe lockers, marine use (Schedule 3850) for Mare Island yard.

International Harvester Co. 180 North Michigan Avenue, Chicago, motor truck division, has leased one-story building to be erected by Northern Pacific Railroad Co., at Spokane, Wash., totaling about 100,000 sq. ft. of floor space, for new factory branch, storage and distributing plant, with shop and service facilities. Frank E. Martin, 254 Main Avenue, Spokane, is general contractor. Cost close to \$250,000 with equipment.

Skookum Co. 8506 North Crawford Street, Portland, manufacturer of mechanical specialties, has let general contract to Avondale Construction Co., 629 S.W. Oak Street, for one-story machine shop, 50 x 125 ft.

Bureau of Yards and Docks. Navy Department, Washington, will prepare plans soon for following construction at Mare Island Navy Yard: one-story foundry to cost \$1,100,000 with equipment; one-story addition to pattern shop, including storage facilities, cost \$100,000; extensions and improvements in power plant, and equipment installation, \$375,000; new high-frequency naval radio transmitting station, \$400,000 with equipment, towers, etc.; extension of dike No. 12, cost \$250,000; additional magazine buildings, \$200,000; one-story building for explosive "d" loading plant, \$50,000.

Board of Education. Glendale, Cal., plans new two-story and basement industrial building, 50 x 140 ft., for equipment storage and distribution. Cost about \$75,000. Financing is being arranged in part through Federal aid. Erwood P. Eiden, 106 East Wilson Street, is architect.

◀ FOREIGN ▶

Darwins, Ltd. Sheffield, England, steel manufacturer, has authorized expansion and improvements in mill, including one-story units and machinery for production of steel specialties for automotive, aircraft and other industries. Capacity of plant will be increased about 25 per cent. Cost about \$450,000 with equipment. Company recently began erection of one-story mill addition for cold rolling of stainless steel strip.

Eli Lilly & Co. 740 South Alabama Street, Indianapolis, manufacturers of chemical products, drugs, etc., has approved plans for branch plant on 20-acre tract at Basingstoke, near Southampton, England. Initial unit will be four stories, 60 x 220 ft. Cost over \$200,000 with equipment. Company will remove present plant at London to new location on completion of building.